



PROJECT MANAGEMENT: FROM KICK-OFF TO CLOSE-OUT



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PREFACE

Project management is a complex discipline involving various phases, methodologies, documentation and outputs. This can often be intimidating to learners, especially when they encounter the subject for the first time. *Project Management: From Kick-off to Close-out* aims to simplify the learners' experience when it comes to the broad, technical nature of project management, by following a three-pronged approach. The first component of this approach aims to situate project management processes within the everyday work environment. This is achieved by contextualising all project management processes within the project management life cycle. As such, learners will be equipped with all the knowledge and tools required for running a real-life project from kick-off to close-out. Current terminology, concepts, processes and structures are all unpacked in a logical sequence, with the aim of guiding learners from project initiation, through project planning, to project execution, project monitoring and control, and finally, project closure. The second component of the approach outlines the creation and usage of project management documentation and aids. These include work breakdown structures, critical path diagrams, Gannt charts, quality plans and risk registers. The final component of the approach focuses on understanding projects in a practical environment. The textbook also dedicates an entire unit to exploring case studies, in order to guide learners through the application of the tools discussed throughout. As such, *Project Management: From Kick-off to Close-out* is a comprehensive guide for both newcomers and professionals who aim to refine their skill set.

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PART 1

FRAMING PROJECT MANAGEMENT

Part 1 comprises the following unit:

Unit 1: Project management within organisations

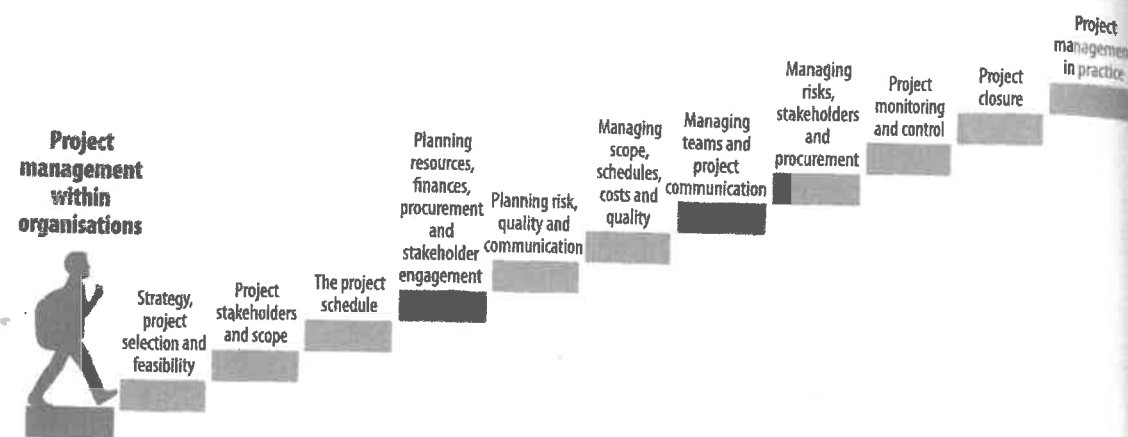
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WITHIN ORGANISATIONS

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1.1 INTRODUCTION

Nolitha works for the Bela-Bela Local Municipality in Limpopo as a community health officer. She has recently decided to begin the roll-out of a newly developed Human papillomavirus (HPV) vaccine to local schools and municipalities, in order to better protect young women against cervical cancer. A project of this size will require careful planning and management on Nolitha's part. Firstly, she needs to gather the relevant information regarding the vaccine's effectiveness, price, availability, and feasibility. Once she has this information, she must begin to construct a business case and perform a feasibility study. If the upstream stakeholders (her boss or investors) grant her permission, Nolitha can begin the project in earnest. This project will entail developing plans, assembling a team, gathering resources and, ultimately, delivering vaccines to those in need.

There are two very important things to remember about projects. Firstly, every project, no matter how great or small, is important to someone. Whether it is the roll-out of a new vaccine, the construction of a new bank, or cooking a meal, every project is valuable to someone. Secondly, without proper planning and management, projects are likely to fail or deliver incorrect results. Imagine trying to use a recipe for a pizza to make a hamburger, but using the ingredients for chocolate mousse. Project management involves the study and practice of ensuring that all projects, great and small, are successful and run smoothly from start to finish.

After studying this unit, you should be able to:

- define the terms 'project' and 'project management';
- identify different types of projects and explain project complexity;
- outline the roles and responsibilities of a project manager;

- discuss the various phases of the project management life cycle;
- identify the role of each phase of the project management life cycle in a project;
- evaluate the role and value of projects within organisations;
- discuss the importance and functions of the project management office; and
- apply your knowledge of projects to both fictional and real-life cases and scenarios.

1.2 KEY TERMS AND DEFINITIONS

The following key terms and definitions are applicable to this unit:

- **Deliverable:** The end result of a project, whether this is a physical object (such as a car, building, or meal), intellectual property (including insight, data, or patents) or a transition from one state to another (such as moving offices or reorganising the workspace).
- **Manager:** A person in charge of planning, organising, administering and guiding a project, team, or organisation.
- **Organisation:** Any group of people who have formally joined together to serve a common purpose. This includes businesses, governments, non-profits and educational institutions, among others.
- **Plan:** A well-considered, structured proposal that details how to achieve a specific set of outcomes, given the available resources, budgets and timelines.
- **Project:** A temporary, well-planned undertaking by an organisation or individual to develop some kind of deliverable (whether physical or intellectual), or to facilitate the transition from one state to another (Project Management Institute, 2017: 36).
- **Project Management:** The sum total of all the activities related to the initiation, planning, execution, monitoring, control, and closure of a project.
- **Resources:** The materials, labour and/or other inputs required to complete a project. Resources can be physical (machinery, infrastructure and computers), intellectual (patents, copyrights and designs), financial (loans, capital and cash flow), or human (skills, staff, and support).
- **Risk:** A situation in which the outcome is not predictable or controllable, and in which the outcome is often due to chance. Traditionally, risks were seen negatively; however, some risks can lead to potential opportunity or reward.
- **Scope:** The boundaries of what can and should be done within a project to ensure its completion, as well as the handover of a deliverable. The scope of a project focuses on the necessary components, and limits unnecessary 'extras' that could strain the project's budget, resources, or schedule.
- **Stakeholder:** Any person or organisation that is invested in the completion of a project. While stakeholders can be owners, funders or managers, the term also applies to the various staff, vendors and subcontractors who want to see the project completed.

1.3 DEFINING A PROJECT

Projects of all sizes are temporary undertakings designed to transition an organisation from its current state to a future state. For example, a company that sells its products nationally may seek to expand into other countries to improve sales. A project could be initiated to transition the

current state of national sales to a future state of international sales. The future state is determined by the project's outcomes and deliverables, or by that which will be created as a result of the project (Project Management Institute, 2017: 36).

1.3.1 Project characteristics

A project's characteristics fall under two categories: success criteria and project characteristics. Success criteria are measures used to evaluate whether a project has succeeded or failed, or whether it requires an extension to be completed. These criteria are also known as functional objectives, because they describe a particular function that the project is able to perform. On the other hand, project characteristics are a set of attributes that can determine whether the project succeeds. Characteristics are also known as non-functional objectives, as they are qualities that are apparent in a completed project.

Success criterion	Description
Budget	In a survey conducted by Songer and Molenaar (1997), the most important criterion for judging a project's success is whether it is completed within or under its agreed-upon budget.
Client expectations	The second-most important criterion is whether the project meets or exceeds <i>all</i> of the client's expectations.
Disruption	A project should have minimal disruptive impact on its immediate environment, including staff, infrastructure, or the actual environment.
Quality	The project deliverable should conform to all accepted standards of quality (e.g. ISO standards).
Schedule	The project must be completed on or <i>before</i> the agreed-upon date.
Specification	The project deliverable must meet or exceed its initial technical specifications.

(Source: EDGE Learning Media (Pty) Ltd, 2020; adapted from Songer and Molenaar, 1997)

Table 1.1: The success criteria of a project

As you can see from this summary of success criteria, most are concerned with ensuring that a project meets the needs of the client. In other words, when undertaking a project, you should ask yourself if you are able to deliver on the project outcomes to the client's expectations and specifications, as well as to a desirable quality, while being under budget and ahead of time. This is no small task.

In order to help you complete such a task, you must understand the characteristics of successful projects. While as many as 15 project characteristics have been identified (Songer and Molenaar, 1997), only five are thought to be crucial. However, other avenues may deem as many as seven of these characteristics as being crucial to a project's success (Epstein, 2015).

Characteristic	Description
A well-defined scope	A well-defined scope establishes what <i>is</i> and what <i>is not</i> part of the project. This narrows the focus of the project and establishes each stakeholder's role within the project. If, as project manager, you were designing an artwork, establishing the scope would be similar to providing the lines that need colouring.
Shared understanding of scope	Since no project is performed in isolation, it is essential that each stakeholder understands the scope of the project, as well as their role within it, regardless of whether they are employees, owners or funders. A shared understanding of scope prevents misunderstandings, misspent budget, lost time, and project failure.
Owner's sophistication	How well-equipped for this project is the owner? In other words, how much capital do they have, how much support can you expect, and which technologies can they access? Knowing the level at which the project owner can support the initiation and continuation of the project allows for proper planning.
Adequate staffing	Try as you might, you will be unable to complete most projects by yourself. Whether you are managing projects for yourself or for someone else, you must ensure that you have the necessary staff available. This refers to both the quantity and the quality of staff; having too few staff members or staff that aren't qualified for the job may cause the project to fail.
A well-established budget	Where the scope of a project limits what <i>should</i> be done, its budget limits what <i>can</i> be done. A budget limits your access to resources, technology and staff. Understanding the size and distribution of the funds at your disposal will allow you to make more educated decisions while undertaking your project.

(Source: EDGE Learning Media (Pty) Ltd, 2020; adapted from Songer and Molenaar, 1997)

Table 1.2: The five most crucial project characteristics

Songer and Molenaar (1997) identified an additional ten project characteristics, including project size, financing options, and risk appetite. However, during surveys and interviews with owners and project managers, the researchers discovered that the five characteristics in the previous table are consistently ranked as the most important by those questioned. These characteristics are pragmatic in nature, and deal with the reality of managing a project 'on the ground'. They force the project manager to ask important questions about budget, owner or stakeholder support, and staff requirements. Unfortunately, leaving such questions unanswered will likely doom any project.

The remaining characteristics are considered less crucial, but nevertheless important. These can be seen in the following table.

Characteristic	Description
A single purpose or deliverable	Upon completion of the project, you will need to have <i>delivered</i> something. This may be a physical object, or something intangible such as a patent, research paper, or the optimisation of workflow.

Uniqueness	The Greek philosopher Heraclitus once said, 'No person steps into the same river twice, for it is not the same river and they are not the same person' (Graham, 2019). Similarly, no project will be repeated exactly the same way more than once. There will always be variables that you cannot control, but must account for, in your management.
Temporary	Project managers, materials, and staff come together for the duration of the project, but go their separate ways once the project is completed. A project is designed to be temporary.
Intra-organisational	Due to its staffing, technological and material needs, a project must draw on resources from various departments within an organisation. Just as a project manager is unable to complete a project on their own, a single department or profession is unlikely to be able to complete a project within budget and on time without assistance.
Unfamiliar	As each project is unique, there will always be an element of the unfamiliar, whether in the staff requirements, technology, materials, location, owners, or scope of the project.
Risk	Each project comes with associated risks, but the greatest risks are associated with the failure of a project. These may include the jeopardisation of the company's financial or reputational standing or security, or the career of the project manager and, in more extreme circumstances, the lives of staff members.
Goal-oriented	Projects revolve around goals. Once these goals have been achieved, the project is considered to be complete.

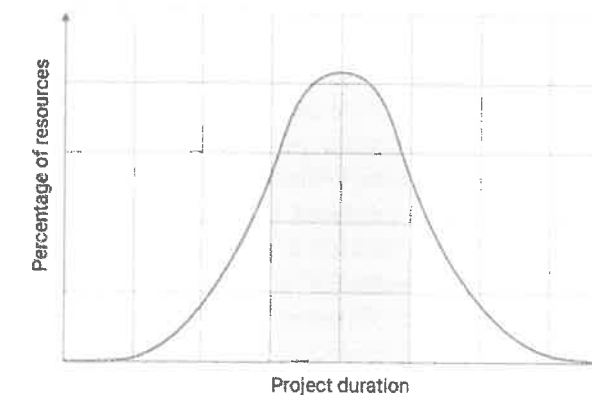
(Source: EDGE Learning Media (Pty) Ltd, 2020; adapted from Epstein, 2015)

Table 1.3: A further seven project characteristics

Contrast these project characteristics with those in Table 1.2. While Table 1.2 deals with the realities of managing a project, the characteristics in Table 1.3 deal with the 'spirit' of the project. They deal with the ideals of cooperation, uniqueness, risk and purpose. No single set of characteristics will see you safely to the end of a project. The most ambitious projects, from the moon landing to the human genome project, consisted of a great spirit that was harnessed by real needs.

Project characteristics can also be defined according to their risk, cost, and resource profiles. Initially, as seen in the following figure, the majority of a project's resources are dedicated to the execution phase. On either side of the red lines in this figure, you will see the amount of dedicated resources steadily increasing as the project transitions from the initiation and planning phases, and steadily decreasing as resources are freed up during the closure phase. Note that the majority of a project's resources will be used during the execution phase, as indicated by the shaded area of the graph.

The dedication of resources during a project

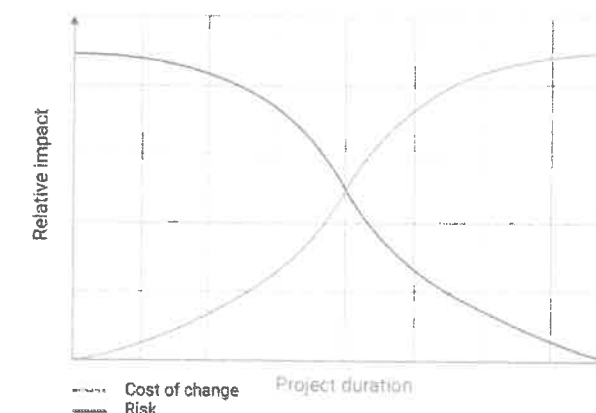


(Source: EDGE Learning Media (Pty) Ltd, 2020)

Figure 1.1: The relative amount of resources dedicated to a project throughout its duration

The following figure illustrates that a project can also be characterised by its risk and cost-to-change profiles. The riskiest stages of a project are usually those in the beginning; the smallest setback can lead to premature project closure. Despite this, it is best to make any changes to a project during these initial phases, when the cost of change is low. As a project progresses, the potential impact of risks is reduced, because you will have established plans and structures in place to deal with risk, as well as qualified staff on hand to assist you. While there is a reduced risk during the later stages of a project, the cost of making changes will be significantly greater, as you will most likely need to redo some work in order to implement the desired changes. Understanding these characteristics is crucial to understanding your project and being able to plan and manage accordingly.

The impact of project duration on risk and cost of change



(Source: EDGE Learning Media (Pty) Ltd, 2020)

Figure 1.2: The effect of project duration on the impact of risks and cost of change

1.3.2 Types of projects

Projects come in many forms, although there are four basic categories under which a project can fall: manufacturing, construction, management, and research (Sindhuja, n.d.). Successful manufacturing projects will result in the production of a tangible product, such as a toy, car or laptop. Similarly, the outcomes of construction projects include completing a building or section of infrastructure, such as roads, mines, refineries or houses. Management projects do not always result in a tangible object being produced, and are mainly concerned with the structuring of tasks such as the merging of two business or the liquidation of another. Lastly, research projects have broad, fluid and often unpredictable outcomes. These projects are instigated in order to investigate an organisation's areas of interest, such as process efficiency or worker skills. Typical research projects include scientific research at a university or opposition research during a political run.

? EXERCISE 1A

- (i) Identify the phase during which most of a project's resources will be allocated.
- (ii) Conduct your own research on the ISO, and then answer the following questions.
 - a. Define the term 'ISO'.
 - b. In fewer than three sentences, discuss why such structures are important.
- (iii) Consider Figure 1.2 and, in fewer than six sentences, provide a relevant example demonstrating the principles shown. In other words, examine a hypothetical project and discuss a situation that exemplifies the risk to cost-of-change relationship during the course of the project.

1.4 DEFINING PROJECT MANAGEMENT

Project management was practiced for thousands of years before becoming a formal discipline. Imagine trying to build the pyramids of Giza or Stonehenge without understanding how to manage a project. As the world began industrialising in the 19th century, the greater complexity and connectivity of work made it necessary to develop project management practices. The formalisation of these principles began in the early 1800s with the introduction of oversight and governance offices (Bridges, 2019). The formation of the American Association of Cost Engineers (AACE) and the development of the critical path method (CPM) by DuPont in the mid-1950s ultimately led to the creation of modern project management techniques and institutions (Haughey, 2014).

These early forms of project management were mostly concerned with scheduling, budgets, and work assignments. As the field developed, newer and more complex industries emerged, and

project management expanded to include the now-standard practices of risk management and communications management (Haughey, 2014). While the definition of project management may differ depending on who you ask, most practitioners agree that project management is the culmination of all the knowledge and skills that the manager has been exposed to during their education or career (Project Management Institute, 2017; and Watt, 2014).

Project management is the art and science of bringing together diverse physical, intellectual and human resources in an effort to accomplish a single task in a well-planned and systematic manner. As a project manager, you will have to fill many roles throughout the duration of the project. Your first role will be as a central planner; this encompasses scheduling tasks, allocating resources, and communicating with stakeholders. Once you bring people into the project, you will be required to spend time managing them. Of course, you will also need to keep an eye on the project budget and timeline. It is important to remember that you will need to do all this while managing the client's expectations, creating a deliverable according to their specifications, and managing the constant feedback from your staff. As you can imagine, it is difficult to condense such a complex role into a single definition. Projects are large, complex undertakings, and managing them is an equally large and complex role.

? EXERCISE 1B

- (i) Name any three projects that have made international headlines since 2015.
- (ii) Find a project manager you admire, and then answer the following questions.
 - a. Name the project manager and the company for which they work.
 - b. In fewer than four sentences, motivate why you find this person admirable.
- (iii) Consider your own life, and then answer the following questions.
 - a. Using no more than two sentences, describe a recent project you worked on.
 - b. Indicate whether your project was successful.
 - c. Describe three factors that you believe contributed to the outcome of your project.

1.5 THE PROJECT MANAGER

While it is self-evident that a project manager is the 'manager of a project', the profession is more complex and nuanced than traditional management. First and foremost, the project manager is a leader (Project Management Institute, 2017: 77). Project managers delegate work and decide how this should be done, and act as representatives for the interests of both the project team and the business. It is the duty of a project manager to provide vision, scope and leadership to all stakeholders involved in a project. As such, the role of a project manager can be compared to that of a film director, orchestral conductor, or sports team manager.

1.5.1 Roles and responsibilities

Before we can properly discuss the roles and responsibilities of the project manager, it is important to define a project manager's sphere of influence. This includes those tasks and resources over which the project manager has *direct* control, or over which they *should* have direct control. If you look at the following figure, you will see that the project manager's *direct* sphere of influence is rather small in relation to the size of a project, its resources, and the number of stakeholders. For example, the project manager is responsible for the planning, organising, and assigning of tasks within a project. If the project manager steps outside their sphere of influence and begins accepting deliveries of resources, negotiating with funders or micromanaging the day-to-day operations of each staff member, they will begin to suffer from fatigue and make mistakes.



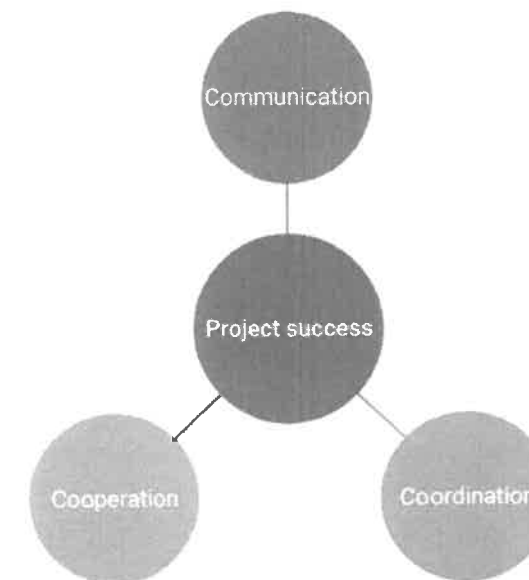
(Source: EDGE Learning Media (Pty) Ltd, 2020; adapted from Project Management Institute, 2017: 79)

Figure 1.3: The project manager's sphere of influence

The Project Management Body of Knowledge (PMBOK) defines five distinct responsibilities of a project manager, each of which relates to a different role to be adopted during the course of a project. The first of these is that the project manager is *responsible* for the project, and must *lead* the team throughout its implementation. Here, project managers are required to integrate feedback (positive and negative) into the project plan, provide feedback to the relevant stakeholders, as well as manage, adapt, foster and utilise relationships among the team to the benefit of that team and the project as a whole (Project Management Institute, 2017: 80).

As you can imagine, the role of leader relies heavily on proper communication. Ineffective communication can lead to project failure. Unfortunately, this is something that the majority of project managers struggle with – even if they are competent in all other areas of project management (Zwikael and Globerson, 2004). The role of the project manager as *leader* and *communicator* is therefore crucial to a project.

In fact, effective communication is so important that some consider it to be the key to a project's success (Badiru, 2008: 121; and Samáková et al., 2013: 155). If you take a look at the 'Triple C' model in the following figure, you will see that communication forms the bedrock of cooperation. After all, being unable to communicate means that you will not be able to cooperate with staff and stakeholders. This, in turn, means you cannot coordinate resources, skills, funds, or schedules – which ultimately leads to project failure. Therefore, as a project manager, you will need to develop proper written, verbal and public communication skills (Project Management Institute, 2017: 80).



(Source: EDGE Media (Pty) Ltd, 2020; adapted from Samáková et al., 2013: 156)

Figure 1.4: The Triple C model (communication, cooperation, coordination) of project success

The second responsibility of a project manager is toward the *organisation*, in the role of an *advocate*. The project manager needs to motivate the business case of the project to other managers or leaders. Often, this involves negotiating for shared resources or sharing and acquiring knowledge that would benefit the project (Project Management Institute, 2017: 81). The project manager is also responsible for aligning the project outcomes with the organisation's vision – in other words, ensuring that the project benefits the organisation.

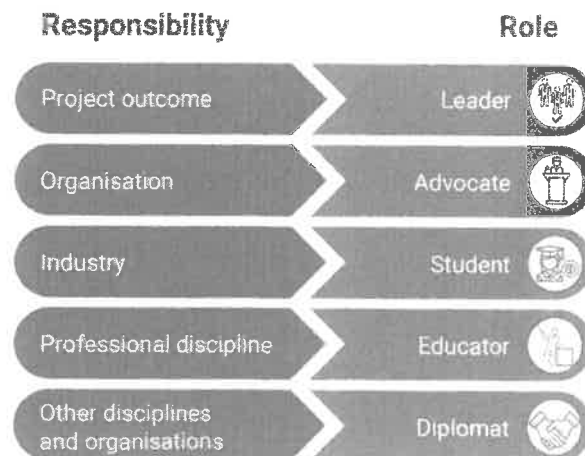
Thirdly, a project manager has a responsibility to the *industry*. It is their duty to remain knowledgeable with regard to the latest findings, techniques, technologies and procedures that are applicable to their field (Project Management Institute, 2017: 82). Here, the project manager's role is that of a *student*, as constant learning and development are necessary to maintain a competitive advantage. For example, not being aware of the latest quality assurance standards required by oversight committees could unnecessarily delay the completion of a project while everything is brought up to standard. Similarly, not being aware of recent developments in manufacturing technologies might result in more waste, higher costs, or slower production.

Lastly, not keeping abreast of market or economic trends may cause the project manager to misrepresent the feasibility or business case of their project, which could lead to a deliverable that is no longer suited to the market.

The fourth responsibility within the project manager's sphere of influence is toward a *professional discipline*. Primarily, this entails the transfer of knowledge and skills, as well as their integration into a variety of disciplines or environments. Here, the role of the project manager is similar to that of an *educator*. The project manager needs to train and upskill the relevant employees, while contributing to the body of knowledge on project management, so that those who follow in their footsteps can avoid the same hurdles that the project manager experienced (Project Management Institute, 2017: 82).

Lastly, the project manager assumes the role of *diplomat* while fulfilling the responsibilities of project management across *disciplines and organisations*. In this role, the project manager is tasked with bringing new (and perhaps inexperienced) members onto the project and preaching the advantages and powers of project management to other organisations and departments (Project Management Institute, 2017: 82).

As you can see, for each of the roles of leader, advocate, student, educator and diplomat, a crucial requirement is proper communication. Without it, none of the project manager's responsibilities can be fulfilled.



(Source: EDGE Learning Media (Pty) Ltd, 2020; adapted from Project Management Institute, 2017)

Figure 1.5: Responsibilities and roles of the project manager

The project manager requires several additional *skills* in order to remain competitive and competent in their field. The PMBOK Guide sorts these skills into three categories: technical skills, which relate to the management and organisation of a project; leadership skills, which are necessary to lead, motivate and organise people; and strategic skills that help the manager integrate with the industry and business environment, in order to deliver a competent service (Project Management Institute, 2017: 83).

1.5.2 Leadership

By now, you may have realised that being a project manager involves a lot of interaction with other people, especially if you need to lead these people toward particular goals. As such, there are several personality characteristics toward which a project manager should strive in order to be a good leader (Project Management Institute, 2017: 91):

- **Authentic:** This entails accepting people for who they are, regardless of their circumstances, and showing concern or interest in their lives.
- **Courteous:** The ability to be well mannered and follow proper etiquette in a variety of situations.
- **Creative:** 'Out-of-the-box' thinking and the ability to innovate or find uncommon solutions to problems.
- **Culturally understanding:** This includes respecting, understanding and being sensitive to people from different cultural backgrounds.
- **Emotional control:** Being able to understand and manage emotions – your own or others' – is the mark of a good leader. Empathy and emotion allow a leader to connect with stakeholders on a more personal level.
- **Intellectual:** Of course, a leader is expected to be intelligent in their field. This characteristic is linked to the project manager's role of a student.
- **Managerial:** A project manager is expected to be able to manage the workload of a project appropriately. Qualities such as time management, organisation and delegation fall under the managerial qualities of a leader.
- **Political:** A project manager should be able to use their influence, relationships and political savvy to further their project.
- **Service-oriented:** This is a measure of how well a leader *enables* others to do their work. For example, a construction manager may not be able to lay foundations himself, but can enable others to do so by ensuring proper scheduling, task assignment and budget.
- **Social:** A leader needs to be able to negotiate interpersonal relationships, resolve conflict, and accommodate different personalities within a group dynamic.
- **Systematic:** A good leader introduces systems that enable the project to progress smoothly. For example, if an assembly-line worker detects a fault in a component, the project manager should have standardised systems and protocols in place that allow the worker to know what to do, without seeking their supervisor's advice or permission each time.

It is also important that a project manager understands the difference between managing and leading, as projects call for both careful management of tasks and deadlines, as well as motivating leadership. One of the main points to understand is that you *manage work* while you *lead people* (Nayar, 2013). Managers *count* value, whereas leaders *create* value. What this means is that leaders *trust* their staff to work independently and create value. Managers who pay too much attention to what their subordinates are doing run the risk of decreasing the value of the work through constant distractions (Nayar, 2013). The project manager's sphere of influence is limited to their direct responsibilities. If they extend their influence beyond these responsibilities, they *run* the risk of interfering with the smooth operations of a project.



EXERCISE 1C

- (i) In no more than four sentences, justify whether or not micromanagement is a good management tactic.
- (ii) Identify any three qualities that you consider belong to a *bad* leader. Discuss these qualities using no more than six sentences.
- (iii) Research the differences between managers and leaders, and complete the following table.

Manager	Leader
Instructs employees	a.
b.	Challenges the status quo
Sees the short term	c.
d.	Trusts subordinates
Profit- and deadline-motivated	e.
f.	Visionary and forward-thinking
Risk-averse	g.

1.6 THE PROJECT MANAGEMENT LIFE CYCLE

This section concerns the phases of the project management life cycle, which form the foundation of every good project. While different projects may have different needs or interpretations of each phase, they all remain essential to a project's success.

1.6.1 The initiation phase

As the name implies, this is where a project starts. The project manager and 'top-level' stakeholders discuss and develop two crucial documents for the project. The first of these is the business case, which discusses and justifies the necessity of the project and motivates the potential financial or operational gain. In other words, the business case is used to justify the project to the stakeholders. The second document is a feasibility study, which evaluates how likely it is that the project will be completed given the available resources, timelines and goals. A feasibility study further evaluates any potential risk to the organisation (Project Management Institute, 2017: 58). These two documents are often included in the project charter, which is a short planning document proposing the project and requesting its authorisation.

1.6.2 The planning phase

If a project is allowed to proceed, it will enter the planning phase. This may be considered the most critical phase of a project, as poor planning can result in multiple setbacks or outright

failure. It is important to remember that a project plan is not a single plan, but a set of plans that contribute to the health of the overall project. A summary of some basic project plans is provided in the following table.

Type of plan	Description
Scope	The project management team develops the scope of the project. This can help design any subsequent plans, particularly if all stakeholders and staff are aware of the requirements and scope of the project.
Work breakdown structure	The project is divided and subdivided into tasks and subtasks.
Schedule	This is the sequencing and scheduling of tasks, as provided by the work breakdown structure. While certain tasks cannot be started unless others are completed, some are not dependent on prior tasks, and thus provide greater flexibility. Here, a project manager may even reschedule some tasks in order to complete the project ahead of schedule.
Resource	Responsibilities are assigned to the various teams, team leaders, and other stakeholders based on the work breakdown structure. This plan establishes each person's responsibilities, and indicates which resources or skills are required to complete a task.
Budget	While the initial budget may have been decided on in the initiation phase of the project, the budget plan indicates how these funds will be spent. In other words, it establishes how much of the budget will go toward staff needs, resources, or capital.
Procurement	If the project requires that certain tasks or resources be subcontracted or obtained from outside vendors, the procurement plan indicates how to proceed. This plan will have a list of first-, second- and third-choice vendors or subcontractors, as well as guidelines for how vendors are selected, treated and paid.
Risk management	Each project has associated risks. The riskmanagement plan is a complex document that evaluates potential risks to the project using a riskassessment matrix. This tool indicates the likelihood and impact of each risk, and provides solutions that can be implemented in the event of risks.
Quality assessment	Since each project has a deliverable, the project manager needs to provide guidelines for staff to assess its quality. For example, if managing a construction project, a plan should be in place that indicates when, where and how the quality of the various construction phases (foundation, roofing, interior) will be assessed.
Communication	The communication plan indicates what, when and how communication occurs between the project manager and all other stakeholders.

(Source: EDGE Learning Media (Pty) Ltd, 2020; adapted from Watt, 2014: 73)

Table 1.4: The different types of project plans

Research has shown that while most project managers are capable of planning the more 'concrete' aspects of a project (budget, work breakdown structures etc.), there are two areas that are consistently troublesome. Riskmanagement planning and communication planning are

considered the 'Achilles heels' of modern projects, as these are often critical to the success or failure of the project (Zwikael and Globerson, 2004).

1.6.3 The execution phase

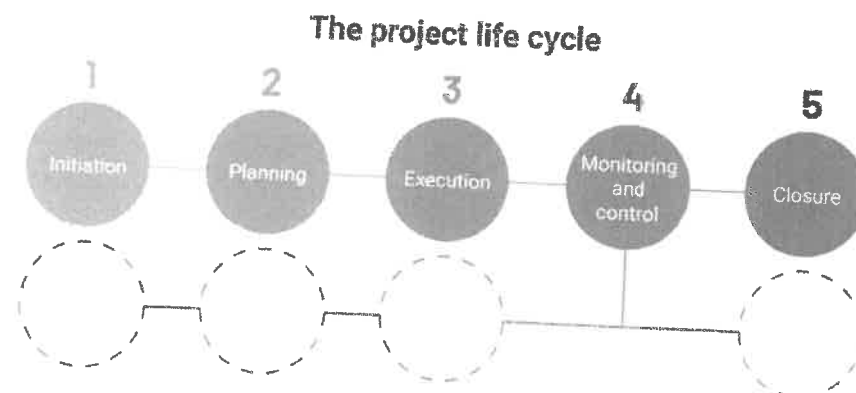
The bulk of the project schedule is dedicated to the execution of the project. During this phase, the assignment of resources is dictated by the resource plan, and tasks are completed according to the work breakdown structure and schedule plan. This is the phase during which the project team is hard at work, creating the project deliverables that will be handed over to the customer.

1.6.4 The monitoring and control phase

Traditionally, the monitoring and control phase formed part of the execution phase. However, as projects increased in size and complexity, it became necessary to expand the scope of this phase. The monitoring and control phase occurs simultaneously with every other phase in the project. After all, it serves to monitor the performance and efficiency of the project, detect any deviations from the plan, and control or correct such deviations (Watt, 2014: 28). This phase requires proper risk management, quality assessment, and communications planning. The staff in charge of monitoring and control need to know what risks to be aware of, how to assess the quality of the deliverable at a particular stage, and how to communicate their findings to the relevant person.

1.6.5 The closure phase

During the final phase of the project, deliverables are handed over to the customer. All the resources that were used during the project are released, and may be reallocated to other projects. Any documentation generated during the project is catalogued, including the termination of supplier and subcontractor contracts, and all remaining stakeholders are notified (Watt, 2014: 189). Finally, the project manager and key stakeholders conduct a debriefing in which they analyse the successes and failures of the project, and develop strategies to improve future projects (Watt, 2014: 190–191).



(Source: EDGE Learning Media (Pty) Ltd, 2020)

Figure 1.6: The project life cycle

? EXERCISE 1D

- (i) Projects may require unique planning documentation. Conduct your own research and discuss one type of plan that is not listed in Table 1.4. Your answer should not be longer than six sentences.
- (ii) In no more than four sentences, explain how project staff can be considered stakeholders in the project.
- (iii) Discuss the importance of a debriefing session once a project has closed. Your answer should not be longer than four sentences.

1.7 PROJECTS AND ORGANISATIONAL STRATEGY

Historically, project management focused on the perfect execution of a project. In other words, it was a tactical (short-term) endeavour that sought to complete a project as effectively and excellently as possible (Tharp, 2007). However, tactical excellence does not always lead to strategic (long-term) success. Think of strategy as being a marathon culminating in a final goal or objective (the finish line). Each project is another step along a course toward the business's final goal. Now, if the project manager (the runner) is unaware of the organisational strategy (the marathon), they might not see how each step contributes toward the bigger picture and leads to long-term success (Rao, 2007). Therefore, in order to ensure that each project creates value for the organisation, the project manager should remain aware of the organisational strategy. Each short-term project should function as a building block toward securing the objectives of a long-term strategy.

Consider a vehicle manufacturer with a stated goal of exclusively producing electric vehicles by the year 2030. As a project manager, your chances of having a project approved for a new petrol or diesel vehicle will be significantly lower than if you were to pitch an electric vehicle. Alternatively, if the company does approve a petrol or diesel vehicle, there is a good chance they will be wasting their money, as both their strategy and the market are changing. By aligning your proposed projects with the business's organisational strategy, you will ensure that your projects are more likely to be approved, successful, and able to add long-term value to the organisation, while also ensuring that the organisation does not lose money on the project.

1.8 THE PROJECT MANAGEMENT OFFICE (PMO)

Project management offices (PMOs) have existed in one form or another for almost as long as the projects they manage. However, their formal history began in the early 1800s as oversight offices for agricultural, governmental, or colonial affairs (Ray, 2017). At that time, their main function was to ensure that funds were not spent inappropriately and that the demands of the central organisation (usually a government or head office) were met on time.

Since their establishment, the scope, functions and responsibilities of PMOs have expanded greatly from 'overseeing' to *supporting, controlling and directing*, or a combination of the three

(Miller, 2017). Research undertaken in 2016 found that nearly 85 per cent of all organisations have a PMO, and nearly 30 per cent of companies without a PMO plan to establish one in the near future (Miller, 2017). These high rates of organisational PMO integration arose from a need to stop the rising number of failed projects (Watt, 2014: 40).

Across various industries, PMOs perform six broad functions (Dietrich et al., 2010):

1. Managing the archives of all completed projects, whether successful or unsuccessful
2. Researching, developing, maintaining and disseminating project standards
3. Administrative assistance
4. Human resource and staffing assistance
5. Training, coaching or mentoring staff
6. Training, coaching or mentoring project managers

There are five categories of PMO, each with its own responsibilities and spheres of influence (Ten Six, 2016):

1. *The business unit PMO*: The most common iteration of the PMO, responsible for the operation of a single organisational unit or department.
2. *The enterprise PMO*: Reports directly to the C-suite (the various 'chief' officers in an organisation). This PMO ensures that projects are aligned with organisational strategy. An enterprise PMO directly oversees other PMOs, or issues directives or protocols to them, in order to ensure organisation-wide compliance with strategic objectives.
3. *The project PMO*: Often set up temporarily to support a single project, after which it dissolves and becomes reintegrated into the main (enterprise) PMO.
4. *The project support PMO*: Appears most frequently when project completion or deliverable handoff has repeatedly failed or been subpar. Project support offices often house the necessary software, tools, expertise and knowledge to complete projects.
5. *The centre of excellence*: Functions as an organisation's training, mentoring or coaching hub.

1.8.1 Reporting structure

A simplified reporting structure of an organisation with a PMO is shown in the following figure. The project staff report directly to project managers, who report directly to the PMO. The PMO then processes the information before conveying it to the chief executive officer (CEO). This strict hierarchy is closely observed in an organisation. For example, if the CEO or PMO were to speak to or direct team leaders, it would undermine the authority of the project manager, who should have a deeper and more hands-on understanding of the project.

Think of the PMO and CEO as more removed versions of the spheres of influence depicted in Figure 1.3. If a project manager or team leader were to skip a level in the company's hierarchy and attempt to report to those higher up the chain of command, it would raise questions about the competence of the levels that were skipped. Considering their differences in scale, responsibility and influence, each subsequent level must decide what information is important enough to be

communicated to the next level. For example, the CEO cannot address or resolve each of the project manager's concerns. The PMO decides what is actionable for the CEO, saving time and money, and preventing frustration.



Source: EDGE Learning Media (Pty) Ltd, 2020)

Figure 1.7: The typical reporting structure in an organisation

1.8.2 PMO functions

A PMO has several functions related to the governance, direction, management, support and transparency of a project (Ray, 2017). However, it is important to understand that, much like a project, a PMO is most effective when it is aligned with organisational strategy and fully integrated into the organisation (Dietrich et al., 2010). The more PMO functions align with organisational strategy, the more useful the PMO will be. The proper alignment of the two will ensure more successful projects in the long term.

The five main functions offered by any mature PMO include the following (Ray, 2017; and Ten Six, 2018):

1. *Governance*: This serves to provide oversight and accountability for those projects that fall under the scope of the PMO. This may mean that the PMO will request audits or peer reviews of the project, although it is generally responsible for assigning the right people to the right job.
2. *Transparency*: This ensures that all the necessary information is correct, easily accessible, accurate and standardised. A project manager can only make good decisions concerning a project's planning or execution if they have access to high-quality information.
3. *Reusability*: The PMO promotes access to the knowledge contained in its archives, and facilitates archiving this knowledge, as well as its use and dissemination. The PMO saves time, money and resources by preventing project managers from having to rediscover knowledge for each project.

4. *Delivery support*: One of the main functions of a PMO is to reduce the time between project initiation and closure, by offering services designed around training, mentoring or smoothing bureaucratic or regulatory hurdles (by ensuring compliance).
5. *Traceability*: The PMO archives any documentation generated during a project's lifetime. Documents such as invoices, modified protocols, intellectual property and communications need to be properly archived in order to ensure transparency and reusability.

1.8.3 Project management governance

PMOs are the guardians of 'good governance', and are responsible for performing audits or peer reviews of projects or downstream PMOs. In other words, they ensure that projects align with international standards, accepted good practices, and various compliance and legal frameworks. To do this, PMOs execute various training and educational seminars throughout the year.

1.8.4 Project management methodology

PMOs are responsible for the research, development, training and archival records of the various project management methodologies (PMMs) that currently exist (Project Management Institute, 2017: 76). The deployment of a new PMM occurs in six stages (Ozmen, 2013):

1. *Awareness*: A new PMM is introduced, discussed and analysed. There may be resistance to change; questions and open discussions surrounding the new method should be encouraged.
2. *Sponsorship*: The leadership (the C-suite or executives) must endorse the new PMM. At this stage, it is necessary for leaders to 'sell' the new methodology to their subordinates.
3. *Readiness*: Here, the new PMM is rolled out, while everyone is kept informed and in constant communication. The project team's change management plan is implemented and operational hurdles are addressed and overcome.
4. *Acceleration*: Rather than overlaying a new method onto an existing project, the existing project is integrated with the new PMM. Tools, schedules, life cycles and training provided by the new PMM are adopted.
5. *Maturity*: Ongoing education and feedback are integrated with the new PMM. At this stage, the impact on the cost-return ratio of PMM implementation can be determined.
6. *Excellence*: The PMM serves, or exceeds, the needs of the project and the organisation as intended. Project managers, PMOs, executives and project staff are familiar enough with the technique to solve problems, as well as to refine or adapt the PMM to suit the client's needs.

Some of the most popular project management methodologies are summarised in the following table.

Methodology	Description
Agile	There is intra- and inter-organisational collaboration among many teams. Projects are completed in smaller steps (iterations) instead of major leaps. Deliverables are often considered 'minimum viable products' – those that perform to specifications, but do not exceed them (Aston, 2019).

Scrum	An approach suited to smaller teams with a more closely managed or regimented approach to project management. Progress is completed in several 'sprints', which must be managed and reviewed, and overseen by the scrum manager (Cohen, 2019).
Kanban	A visual technique that uses colour-coded systems to create an iterative picture of the workflow. Project shortcomings, backlogs, bottlenecks, completion, and more can easily be assessed at a glance (Muslihat, 2018). This method requires a kanban board.
Six Sigma	Six Sigma is a data-driven, statistical approach to process or project improvement. The focus is on reducing cycle time (from project initiation to closure), while keeping the number of errors below the margin of 3.4 errors per million cycles (Hayes, 2019).
Waterfall	A traditional, sequential approach to project management. Each step happens only after completing the previous step (Aston, 2019).
PMBOK	A more flexible iteration of waterfall techniques, which is endorsed by the PMI (Project Management Institute, 2017: 68–69; and Aston, 2019). Its basic structure is recounted in section 1.6 and will be discussed later in this module.
Lean	Lean methodologies are based on three principles: <i>muda</i> , <i>mura</i> , and <i>muri</i> . These relate to waste elimination (time, budget, work hours etc.), variance (i.e. ensuring uniformity), and overload (i.e. bottlenecks or stress) (Muslihat, 2018).
Scrumban	A hybrid of scrum and kanban methodologies, combining the regimented leadership and management of scrum with a visual kanban board to manage overview of the various scrums.

(Source: EDGE Learning Media (Pty) Ltd, 2020)

Table 1.5: A brief overview of the most common project management techniques currently in use

Regardless of which project management methodology you choose, it is important to remain flexible. A good project manager adapts their methodology to suit the project, and not the other way around.

1.8.5 Project management processes

Every organisation has its own protocols and procedures to ensure compliance and accountability. The PMO is the seat of all these documents, and will, if necessary, provide the project team with the relevant training to ensure that the project, staff, procedures and deliverables conform to the applicable internal standard. Similarly, should any of these not conform, it is the duty of the PMO to conduct a thorough review of the project management processes and the project itself, in order to ascertain whether the fault lies with the processes, the project, or the project manager.

1.8.6 Project management standards

PMOs function in developing, maintaining and sharing the organisational standards of project management (Dietrich et al., 2010). The PMO may require the project manager to submit any number of documents pertaining to their project, including, but not limited to:

- project charters;
- feasibility studies;

- Gantt charts;
- project plans;
- risk management strategies; and
- progress reports.

The PMO decides which documentation is necessary, as well as the format of documents, construction, and the schedule according to which they must be submitted. These documentation requirements are standardised across all projects in an organisation.

1.8.7 Project management software tools

Modern projects are nearly impossible to manage without the use of computers and software. The greater precision, flexibility and speed offered by modern computing also allows for the development of specialised project management software. This software has functions that includes, but is not limited to, shared workspaces (e.g. Dropbox), scheduling (e.g. Trello), communication (e.g. Slack), or full project management suites (e.g. Microsoft Project). Some of these programs are available for free, although others require paid licences – especially if they are going to be used for an entire organisation or enterprise.

Regardless of what software the project manager chooses, they will need to ensure that it conforms with company policies concerning privacy, copyright or licensing, before acquiring the software. The PMO offers support in this regard. The relevant PMO (often combined with the information technology department), will have available software licences, training and compliance reviews for most software that the project manager decides to use. If the manager would like to use software beyond the PMO's available selection, they can motivate to the PMO why the software is necessary. The PMO will then contact the relevant executive, and if given the go-ahead, will be responsible for acquiring the software, as well as navigating all compliance issues, before passing the software on to the project manager.

1.8.8 Non-strategic projects

Not every project is designed to close with a deliverable that is of strategic importance to the organisation. Consider the production of a new database management software. The critical – or strategic – deliverable is the piece of software. However, without regular maintenance, bug-hunting, or ensuring of compliance, the software will quickly degenerate, lose value, and be discarded. Non-strategic projects are those ensuring the longevity for strategic projects. The overseeing and managing of non-strategic projects are also part of a PMO's responsibilities.



EXERCISE 1E

- (i) In no more than six sentences, discuss the importance of standardising project documentation across an entire organisation.

- (ii) Answer the following questions, which concern your own projects (entrepreneurship, studying or hobbies).

- Have you used project management software? If so, name the software you have used and explain how it helped you to manage a project. Remember that project management software does not always refer to large, expensive software suites, and can include smaller, specialised applications on your smartphone.
- Name the product(s) you used in the previous answer. If you have not used any project management software, name the product(s) you think would have improved the project experience.
- Motivate your answer for one of the products mentioned in your previous answer.

- (iii) In fewer than eight sentences, motivate the importance of a PMO and its role in conducting regular reviews and audits of past and present projects.

1.9 ASSOCIATED FIELDS AND DEPARTMENTS

It is worth repeating that project managers and PMOs do not operate in isolation. Project management takes place at the centre of a wide variety of fields and departments within an organisation, and draws on the expertise of many professionals within and surrounding the business environment. The fields and departments on which a project manager may rely include, but are not limited to, the following:

- **Human resources (HR):** Conflict resolution, employment contracts, payment, office disputes, sexual harassment claims, and various other functions are fulfilled by the human resources department. Project managers should liaise with their HR officers regularly, specifically during staffing disputes, in order to ensure the smooth operation of their projects.
- **Law:** An organisation's legal department handles information or disputes relating to legal matters, such as compliance or intellectual property. Acquiring the legal go-ahead is essential for any project that seeks to avoid setbacks or delays due to compliance issues.
- **Accounting:** Accountants are concerned with the financial aspects of projects, and ensure that the project budget is available to be spent. In addition, they help with estimations, deal with payroll disputes, and much more. Communicating with accounting is essential for a project's healthy cashflow.
- **Information technology (IT):** Modern organisations rely on computers. The IT department is concerned with computer software and hardware infrastructure, troubleshooting, licensing, support, as well as any other function relating to the smooth operation of computer infrastructure.
- **Logistics:** This encompasses the transport of materials and waste to and from the project work site, as well as the final handoff of the project deliverable. Logistics may even be involved in staff transport.

- **Sales:** The development of a new product or service is futile without customers to buy it. The sales department ensures that the project deliverable ultimately yields a profit.
- **Support:** Support teams are responsible for long-term customer satisfaction. This entails the resolution of any technical problems the deliverable might encounter, as well as assisting the customer with any queries regarding the product or service.
- **Marketing:** In addition to being able to sell and support the project deliverable, an organisation must make customers aware of the deliverable. Marketing departments are responsible for the development of marketing plans and strategies that make the deliverable appealing to potential customers.

1.10 PROJECT MANAGEMENT IN PRACTICE

A classic project management failure can be illustrated in a story from World War 2. At the height of the war, the United States of America (USA) was no longer able to provide British and French troops with the tanks they desperately needed. Instead, the USA gave the British and French governments the necessary designs, enabling them to build the tanks themselves.

However, once the first tanks rolled off the production lines, the British and French quickly realised that the armour was too thin, the cannon barrels too narrow, and the overall design lopsided. Basically, the tanks were not the brand-new American machines seen on the battlefields.

Naturally, this led to a series of major arguments among the governments and their respective engineers and generals. Luckily, someone eventually noticed that the American designs had been calibrated in *inches*, but the British and French engineers had used metric units. Once the misunderstanding was cleared up and the designs converted to the correct units, the British and French were able to manufacture the American tanks quickly and effectively.

Required:

- (i) Name the institution that would have helped to avoid the miscommunication in the project mentioned, and explain how this institution could have done so.
- (ii) By the time the mistake was discovered, both the British and French had already committed the majority of their resources to production.
 - a. Name the phase of the project cycle this dedication of resources resembles.
 - b. In terms of risks and costs, discuss the impact on construction that would result from having to change the tank specifications mid-production. Limit your answer to four sentences.

1.11 SUMMARY

This unit has introduced you to some of the fundamental concepts of project management, and you should now be familiar with the language of project management. In addition, you should be able to identify the various types of projects, their life cycles, as well as your role as project

manager. You should also understand how incredibly complex large organisational projects are, and how to manage this complexity. Furthermore, knowing how complex these projects are, you should be able to rely on the organisational PMOs to help you manage and deliver your project.

Most importantly, you should have learned the importance of communication and leadership in being a good project manager. Remember that you can manage work, but you *have* to lead people. People must, after all, *want* to complete the project as much as you do. The following units will go into more detail about each of the concepts introduced in this unit.

PART 2

PROJECT INITIATION

Part 2 comprises the following two units:

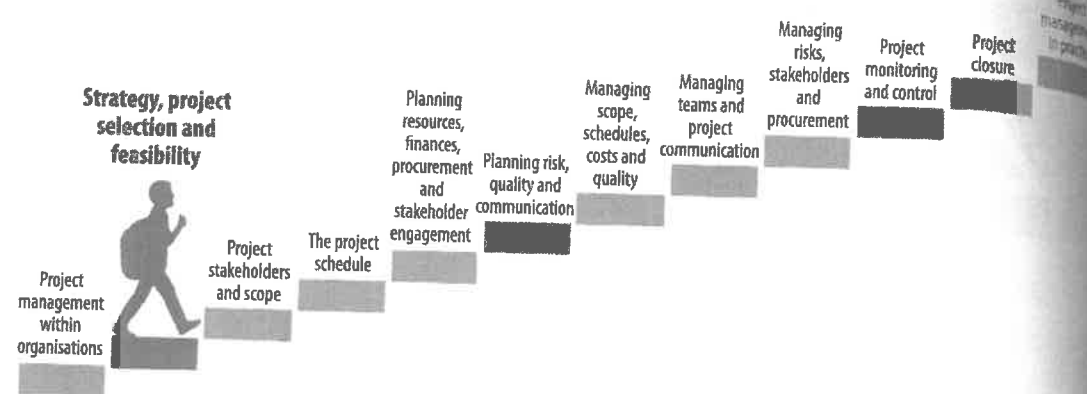
Unit 2: Strategy, project selection, and feasibility

Unit 3: Project stakeholders and scope

2

STRATEGY, PROJECT SELECTION AND FEASIBILITY

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2.1 INTRODUCTION

Kevin decides that he would like to upgrade his company's existing technology to increase productivity and efficiency. A number of staff members agree with Kevin and support the upgrade. However, some of his employees believe that their existing computers and equipment are adequate and that an upgrade is not necessary. Before making a decision, Kevin's secretary, Anisha, recommends that a feasibility study be carried out to determine if it will make good sense to upgrade the company's technology at this point in time. Kevin ignores Anisha's suggestion and decides to go ahead with the upgrade over the course of the following month.

When the new computers and equipment arrive, employees are surprised and are not sure how to go about moving their work onto the new systems. In addition, several employees do not know how to use the new equipment, so they require training to be able to get work done. Kevin's lack of planning and strategy ends up doing the opposite of what he intended: productivity is decreased and it is months before everyone is comfortable with the new technology. As a result of Kevin's actions, his company performs worse than ever before and his employees are displeased.

When it comes to project management, there are a number of steps and processes that must be followed to ensure that a desirable outcome is achieved. In the previous example, there are several aspects that need to be highlighted. First, Kevin failed to do adequate research and did not get buy-in from his employees and stakeholders. While an employer or boss may have the ability to make a decision and go ahead with implementing a plan, this can be a major risk that can be harmful to a business and the people who work there. Second, Kevin ignored his secretary's advice and did not determine whether his proposed project would be feasible. In other words, Kevin did not take the time to figure out if it made sense to go ahead with the upgrade or if it

would be better to wait a while longer. A third aspect to consider is that Kevin may have been able to choose a different project that would have yielded better returns. As a result of his impatience and lack of forethought, alternatives were not considered.

The importance of careful project planning cannot be overemphasised. According to Stewart (2018), one of the top reasons why projects fail is due to scope creep. A scope is an outline of everything you intend to accomplish as well as situations you want to avoid. Once the scope of work is finalised, it is imperative that it is adhered to as closely as possible to ensure that all targets are achieved as and when required. Unplanned alterations to the scope of work must be avoided at all costs, since this may cause existing budgets, schedules and work allocations to become redundant. If changes are made to a project, the necessary permissions must be obtained. Following this, you will need to ensure that new schedules, processes and deadlines can be set, and new targets can be achieved.

No changes must be allowed without the buy-in of key role players and a strong justification for such changes. This is because the idea behind planning and strategising in the project initiation phase is to avoid alterations later on. If you are thorough in this phase of the project management life cycle, there should be no need to make any changes to the project as it progresses. However, it should not be impossible to revisit or change a plan. When such alterations are necessary, the proper process should be followed to avoid trouble later on.

After studying this unit, you should be able to:

- discuss the importance of project initiation as a definitive phase in completing a project successfully;
- outline the importance and benefits of aligning projects with organisational objectives and strategies;
- unpack the project selection process, making reference to the role players involved and the various methods that can be implemented;
- differentiate between different types of feasibility and detail the process of conducting a feasibility study;
- apply best practice guidelines to create the components of a proposal; and
- apply your knowledge of project initiation processes to both fictional and real-life cases and scenarios.

2.2 KEY TERMS AND DEFINITIONS

The following key terms and definitions are applicable to this unit:

- *Appendices*: Supporting documents that are included in a project proposal.
- *Dissemination plan*: A document describing how information will be shared with a wider audience.
- *Evaluation plan*: Part of a project proposal detailing how a project's success will be determined.
- *Executive summary*: A formal outline of the contents and conclusions of a feasibility study.

- *Feasibility*: The viability a particular task or project.
- *Portfolio*: Every active project in a given organisation.
- *Programme*: A group of similar projects that connect to form a greater scheme.
- *Recommendations*: Actions or initiatives that the project manager believes should be taken.
- *Scalability*: The ability to segment a project and/or broaden or narrow its effect and application.
- *Solicited*: Something that is requested, usually in a formal manner, by someone in authority.

2.3 STRATEGIC PLANNING AND PROJECT ALIGNMENT

All successful projects are comprehensively planned. Good planning is preceded by the formulation of an effective strategy. Aramyan (n.d.) makes a distinction between business planning and strategic planning. While business planning considers required resources and where said resources will be employed, strategic planning determines the amount that needs to be spent on a certain activity at a particular point in a project's development. Strategic planning extends the planning process further to consider factors such as time, place, space and approach. A business plan may allow you to get a project started, but a strategic plan provides you with the tools you need to manage projects and communicate your vision to your employees and key stakeholders (Aramyan, n.d.).

When we consider project alignment, we must also consider the overall strategic vision and objectives of the organisation. To achieve this, alignment needs to be achieved on all levels, namely people, processes and resources (Schroeder & Schroeder, n.d.). For example, if an organisation wants to become a world leader in renewable energy, a coal mining project to generate funding would not align with the vision and objectives of that particular organisation.

People

Projects need the right people to run them. A major office revamp cannot be overseen by inexperienced staff. Similarly, an IT upgrade cannot be undertaken by people who do not have the requisite skills and experience to do so. It is also important to ensure that responsibility is shared. However, a team cannot be too large or productivity will drop and confusion will ensue.

Processes

The correct processes must be followed and completed in a timely manner. A project that is too simple in its design could fail, while one that is too complex could be difficult to implement. The three dimensions set out previously – people, processes and resources – are interdependent. If the wrong people are tasked with completing a project, the processes will not be followed correctly and work will not be completed as required. Similarly, if the processes are too complicated, this might lead to wasted time.

Resources

Resources range from financial resources to equipment and even industry professionals. Budgeting is a central part of resource allocation and remaining within budget can be very challenging; especially when it comes to larger projects. There are almost always unforeseen costs that affect resources. Perhaps the greatest challenge in project management and strategy is using limited resources to achieve a specified outcome.

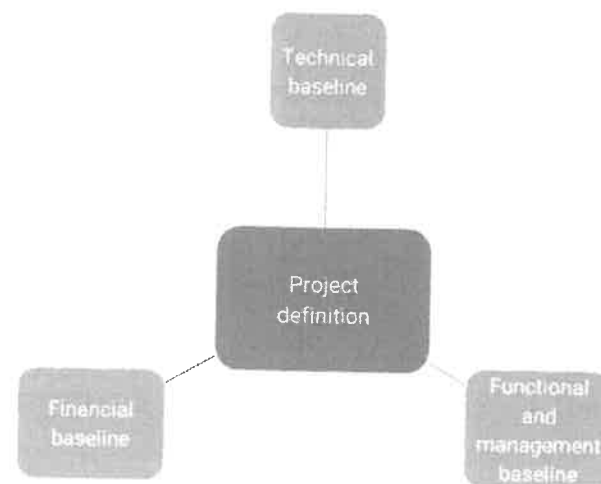
If resources are overextended, the project may be delayed or it may even be terminated entirely (Schroeder & Schroeder, n.d.). This is why resources need to be taken into consideration when formulating a strategic plan. Even when projects have high budgets, poor planning and execution can lead to inefficiencies, resulting in resources being expended more rapidly than anticipated.

If it is possible to save money when initiating and carrying out a project, the possible consequences must be considered. For example, if cement can be purchased at a lower price, will it be of the same quality and consistency as the original cement? A wall or building that falls over or collapses is far more expensive than one that stays standing. Cutting corners and being frugal are separated by a very thin line. Just as cheaper is not always better, higher prices may not be an indication of better quality. This is why research must be performed to find the best fit in terms of budget, quality and quantities. Essential spending must be well planned when laying out resources for a given project.

Methodologies

A project manager must not be tempted to take an existing methodology used by another organisation and apply it to a new case. Methodologies must be adapted to suit a particular organisation's specific requirements and strategic objectives. This is essentially what strategic planning for project management is: the development of a methodology that can be implemented in various projects to ensure that they are completed successfully (Gjorgievska, 2019). Ultimately, however, a project manager does not want to have to create a new methodology each time they want to begin a new project.

It is better to have a simple methodology that is easy to adapt. Complex methodologies may not be scalable, meaning they may be difficult to adapt when projects increase or decrease in size or scope. Ideally, a methodology should consist of a few wider categories and a few subcategories within one or more of these categories. A methodology should begin with a definition – i.e. how the project is defined (Gjorgievska, 2019). The following figure illustrates how a project can be defined, by dividing it into three separate aspects or baselines: technical, functional and management, and financial.



(Source: EDGE Learning Media (Pty) Ltd, 2020; adapted from Gjorgievska, 2019)

Figure 2.1: Example of a standard methodology for project management

Let's look at each of these baselines and what they entail.

Technical baseline

The technical baseline will include:

- a statement of work (SOW), which serves as the basic scope of the project;
- all design specifications and equipment to be used or set up in the project;
- a work breakdown structure (WBS) detailing how tasks will be handled and delegated;
- timelines, phases and schedules of work that will be carried out; and
- a spending curve (S-curve).

Functional and management baseline

The functional and management baseline will determine how the technical baseline will be implemented (Gjorgievska, 2019). Under this particular baseline, you will find:

- curricula vitae (CVs) and supporting documents of key personnel and important stakeholders;
- project policies, regulations and procedures to be adhered to;
- an organisational strategy for the commencement and duration of the project; and
- responsibility assignment matrices (RAMs) indicating who is in charge of what particular function.

Financial baseline

Finally, the financial baseline will be used to plan the project's budget. It will include information about:

- how expenses will be identified, evaluated and prioritised;
- the manner in which any variances or deviations will be explained and justified; and
- the ways in which reports will be prepared and presented to relevant parties.

In the following section, we will discuss alignment, strategic direction and project choice in greater detail.

2.3.1 Aligning strategic direction and project selection

A project must align with a company's strategic direction. One reason why strategy is often not realised is because there are disconnects that occur at different levels of an organisation. For example, executives and managers have communicated the strategy, but leave the execution of tasks to the rest of the organisation (Tharp, 2007). The problem here is that some employees may not fundamentally understand the organisation's strategy and goals. In addition, they may not understand the connection between the organisation's strategy and the processes that are followed during the execution phase.

Balanced scorecard

In some cases, strategy is determined only by the executives in an organisation. While this is not always an issue, it does limit the business. The executive managers may be missing good suggestions and observations from individuals in other parts of the organisation. This is why businesses should have some kind of feedback process in place to make the formulation of strategy more democratic (Tharp, 2007).

Arguably the best way to achieve this kind of internal synergy is to use the balanced scorecard approach. Like methodologies, there are several different types of scorecards that can serve as a framework to align the organisation's strategic direction with the selection of projects and processes, and assist in the successful completion of projects.

Balanced scorecards were first developed by Kaplan and Norton in 1992, and are used to measure strategic performance (Miranda, 2018). In essence, a balanced scorecard exists to bridge the gap between abstract strategic ideas and the physical execution of processes. There are several different kinds of balanced scorecards; the following table provides a good example of one.

	Objectives	Goals	Indicators	Initiatives
Financial perspective	Increase profits, decrease expenses	Increase profits by at least 15 per cent	Financial statements	Expand into three new regions
Customer perspective	Be seen as company with the best service	Respond to 100 per cent of all customer queries	Reports from the call centre	Upgrade existing call centre infrastructure

Internal process perspective	Optimise internal workflows	Increase productivity by at least 25 per cent	Manager and employee reviews	Train key staff members
Learning and growth perspective	Grow skills of all employees	Accreditation for 75 per cent of employees	Exams results, reviews and reports	New resources for employees

(Source: EDGE Learning Media (Pty) Ltd, 2020; adapted from Veyrat, 2016)

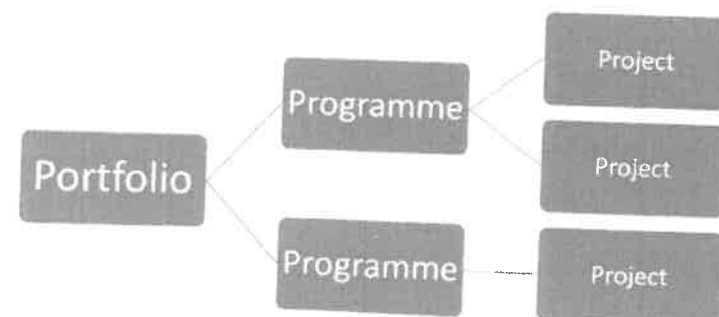
Table 2.1: Examples of a balanced scorecard for a retail company

A scorecard can be used to evaluate the success or progress of a given project. In these cases, it can serve as the building block on which to develop strategy and align the organisation's activities to what it wants to achieve. In our example scorecard, there are four perspectives: financial, customer, internal process, and learning and growth. Each of these is one of the primary domains of a retail company. Each perspective is then broken down into four categories, namely objectives, goals, indicators and initiatives. These categories answer what needs to be achieved, what the targets are, how the success of these objectives will be evaluated and what will be done in order to achieve them.

In essence, a balanced scorecard allows an organisation to determine what it wants to achieve in various spheres and to succinctly state how these objectives will be reached. Of course, the attainment of strategic objectives requires that a number of different projects be initiated, so a project manager will inevitably end up with a portfolio that they will need to manage. This is the next step in strategic planning.

2.3.2 Aligning strategic objectives and portfolio management

Once strategic direction and project selection have been aligned, it is necessary to ensure that the strategic objectives line up with the different projects that are running within an organisation. Before we continue, it is necessary to outline and discuss the difference between a project, a programme and a portfolio.



(Source: EDGE Learning Media (Pty) Ltd, 2020; adapted from Invensis Learning 1, 2018)

Figure 2.2: The hierarchy of portfolios, programmes and projects

A project is the **smallest** unit in the hierarchy. It is a particular venture that only lasts for a certain period of time and results in the creation of one or more deliverables (Invensis Learning 1, 2018). A programme **generally** consists of several smaller projects – or subprogrammes – that are all related to one another. For example, an organisational development programme may consist of team building, communications skills, technical competencies and financial acuity subprogrammes or projects. Programmes are therefore a collection of interrelated projects that exist alongside one another with the aim of achieving a greater goal.

A portfolio consists of a number of programmes and projects. For example, an organisation's marketing portfolio will consist of online programmes, traditional media projects, advertising campaigns and communication programmes. Since portfolios exist at the highest level in the hierarchy, they are integral to an organisation's strategic objectives. Effectively managed portfolios contribute to the growth and evolution of the business and ensure that strategy is applied to all functional parts of the organisation. Based on this, it is clear that there is a causal link between strategic objectives and portfolio management; the two need to be aligned for an organisation to achieve its goals.

Project portfolio management

Project portfolio management (PPM) is a process that is undertaken to align a company's strategy with its activities. Project portfolio management is the evaluation and analysis of an organisation's existing projects to determine their purpose, relevance and benefits in relation to the business's various aspirations (Alexander, 2019).

A portfolio manager will generally handle the revision of projects and decide which ones should continue, which should end and which require additional funding or further review. Remember that businesses have finite resources, so it is not always possible to have every project running at all times. If an existing project is perceived to be unprofitable or not particularly relevant to the organisation's strategic objectives, then it will most likely be terminated to prevent any further loss or misallocation of resources.

This is where PPM is useful. It can assist with the realisation of both medium- and long-term organisational goals. Alexander (2019) discusses some of the steps that should be followed when engaging in the PPM process:

- **Identify existing and potential projects:** Project portfolio management evaluates current and upcoming projects. This is an important and necessary step to follow if a portfolio manager wants to optimise their return on investment (ROI).
- **Determine the impact projects have on strategic objectives:** Every project in a company's portfolio must have easily identifiable medium- or long-term benefits to the business's strategy. Benefits should be communicated to the various stakeholders.
- **Prioritise projects:** After the value and benefits of each project have been found and explained, they must be ordered in terms of their strategic importance. A portfolio manager must decide which projects should be completed first and which should be given additional funding; they need to substantiate why this is the case. This is **critical** step, since prioritising the wrong projects can have undesirable consequences.

- *Allocate resources proportionally:* Once priorities have been determined, resources must be dedicated to each project. Projects that are critical to the organisation's achievement of its fundamental goals should receive more resources than those that are less critical to this outcome. The allocation of resources is crucial since wastage or overlap is undesirable. Overloading and conflicts must be avoided when allocating resources.
- *Change project strategy where required:* If necessary, project strategy must be changed so that strategic alignment is achieved. Putting money towards irrelevant projects can harm an organisation, so strategy must be considered when finalising projects within a portfolio.



EXERCISE 2A

- Create a balanced scorecard with your own criteria for an online social media marketing company.
- Use a table to compare projects, programmes and portfolios, and explain how they are interrelated.
- Define project portfolio management and identify the steps necessary for carrying it out.

2.4 PROJECT SELECTION

It is essential to have information about what the organisation requires before deciding on what project to initiate. This will require analysing one or more areas of the organisation. Given the challenges that exist in businesses, answers are not always simple. For example, a business may be growing and may have insufficient parking space for its employees. However, as it stands, space is already very limited, so adding more parking bays may not be possible. Adding to this, there may not be any budget available for such upgrades. How could this issue be addressed, given the constraints that exist? This is why project selection is important. Since parking space is limited, some possible solutions are:

- the formulation of a 'work-from-home' programme where employees spend certain hours of days of the week performing their tasks from their home;
- the creation of a carpooling system where employees share transportation, thus reducing the number of required parking bays and saving employees money in terms of transport costs;
- the rental or use of a nearby parking garage and the creation of a shuttle service to transport employees between the parking garage and the office; or
- encouraging employees who live close to the office to walk or cycle to work, and for those who live further away to use public transport partially subsidised by the company.

These are just four possible solutions. The question is which of them should be implemented. Projects cannot be authorised by a single party and there is also the matter of gaining stakeholder buy-in: employees may resent being told to walk and there may be employees who do not want to carpool. Organisations grow and evolve with projects and they need the right people behind them to be executed successfully.

2.4.1 Who should be involved?

One of the questions when selecting a project is: 'Who needs to be involved in the selection process?' According to *Pacific Invasives Initiative* (n.d.), there are three parties that must be involved in the selection of a project: the organisation's management and stakeholders, and the project manager. The roles of each party are explained in the following table.

Management	Stakeholders	Project manager
• Determine criteria for selection to ensure that the selection process is aligned with the organisation's strategy. • Perform selection process as a management initiative before appointing a project manager.	• Need to participate to create a sense of community and increase the chances of a successful outcome. • Input must be gathered at the idea stage, as stakeholders will probably have several good ideas. • Must be informed of the overall outcome of selection process.	• Must be involved to ensure understanding of project requirements. • A sense of ownership over and responsibility for the project must be cultivated. • Should be involved to increase chances of a successful outcome.

(Source: EDGE Learning Media (Pty) Ltd, 2020; adapted from *Pacific Invasive Initiative*, n.d.)

Table 2.2: Key role players in the project selection process

Management

The more ambitious a project is, the larger the group of people it is likely to affect. It will be difficult to initiate a project without the permission or guidance of management. Additionally, if the project is not supported by the majority of a company's stakeholders, the chance of failure increases. There is no need to supply all stakeholders with every detail of a project, but informing them of how it will affect them shows that their needs are being considered.

Project manager

A project manager closely monitors the progress and effects of a project. They coordinate, communicate, oversee and guide the roll-out of a project from its inception to its completion. If the parties involved in the project selection process agree with one another and a mutual understanding is achieved, then the smooth roll-out of the project is mostly assured. However, of all these groups, stakeholders are the largest and most complex. For this reason, it is important to discuss the different types of stakeholders that exist within an organisation, as well as their respective roles in the project selection process.

Stakeholders

Stakeholders can be individuals, groups or entire organisations that may be affected by or have an influence on a project (*Invensis Learning 2*, 2018). This means that stakeholders can be identified and divided using different criteria. Broadly speaking, there are two categories of stakeholders:

internal and external stakeholders. The following table breaks these two categories down into smaller parts and identifies the different types of internal and external stakeholders.

Internal	External
• Sponsors • Employees • Internal customers/clients • Project teams • Programme/portfolio managers • Management • Company managers from other teams	• External customers/clients • End users • Subcontractors • Suppliers • The government • Local communities • Media companies/outlets

(Source: EDGE Learning Media (Pty) Ltd, 2020; adapted from Invensis Learning 2, 2018)

Table 2.3: Different types of internal and external stakeholders

The exact mix of stakeholders will depend on the type of project. Trying to cater to all the needs of all possible stakeholders is not practical. For example, in the case of a project that looks to upgrade business IT infrastructure, it is unlikely that local communities will be affected. For this reason, project managers must use their discretion when deciding which stakeholders should be involved in project selection, as well as the nature and extent of their involvement. In a project that involves the training of top-level managers, only the business executives and upper management will need to be involved in the project selection process. When it comes to suppliers and subcontractors, the company may need to choose from an existing list of service providers or scout for new ones. Again, the nature of the project will determine the extent to which these parties will be involved.

Project selection should almost always involve managers and a project manager, but the number and types of stakeholders involved will vary depending on the type and scale of the project being put together. Inputs must be gathered from stakeholders to decide which projects should be chosen and how they should be rolled out.

Management, along with the project manager, should decide on possible options before opening up the selection process to a wider audience. After gathering inputs, alterations or decisions can be made. It should be noted that project selection is not an exact science. For this reason, there are various ways to decide which projects should be pursued and which should be abandoned. In the following section, we will discuss methods that can be applied to make the best project selection.

2.4.2 Project selection methods

There are several approaches that can be applied to make the best choice. Project managers need to have a grasp of the methods that can be used for project selection. In principle, there are two systems that can be used when selecting a project. According to Monnappa (2020), they are:

- benefit measurement methods; and
- constrained optimisation methods.

Benefit measurement

Benefit measurement methods are preferable for smaller, simpler projects. These approaches determine the current estimated inflows and outflows of money. There are eight different approaches within benefit measurement methods (Monnappa, 2020).

Benefit/cost ratio

This is the ratio between the cost presently associated with a project and the present value of return from the project. Projects that have a higher benefit/cost ratio are typically chosen over those with lower ratios.

Economic value added

The economic value added (EVA) is a performance metric that measures the net profit of a project after taxes and expenses. If a number of projects have been assigned to a project manager, then the project with the highest EVA is chosen.

Scoring model

Here, a committee that has been appointed to select a project makes a list of criteria relevant to the project, determines the value of each criterion in terms of its significance and importance, and tallies the weighted values. The project with the highest total score is chosen.

Payback period

This is the amount of time it will take for a project to repay the original cost of its execution. A relatively simple equation is used here:

$$\text{Payback period} = \frac{\text{Cost of project}}{\text{Average annual cash inflows}}$$

Naturally, the project that has the shortest payback period is selected. There are some limitations to this approach, since risks are overlooked and benefits after payback are not considered.

Net present value

The net present value (NPV) is calculated by subtracting the project's existing cash outflows from its present cash inflows. A project with a high NPV is likely to be selected.

Discounted cash flow

The spending power of money decreases as time goes by. R 50 000 today will have more purchasing power than the same amount ten years from now. As a result, it is necessary to take discounted cash flow into account when calculating the total cost of an investment as well as the ROI.

Internal rate of return

This is where the interest rate of the NPV is equal to zero, meaning that your current cash inflows are equal to your current outflows. The internal rate of return (IRR) is used to choose a project with the highest level of profitability, so projects with higher IRRs are generally selected. The IRR should not be used exclusively as a project selection method. For example, a project with a lower IRR may have a higher NPV; if there are no capital limitations, the project with the higher NPV should be chosen.

Opportunity cost

The opportunity cost is the cost that is forfeited when choosing another project. When selecting a project, the project with the lowest opportunity cost is selected.

Constrained optimisation

It is important to remember that all the project selection methods under benefit measurement are best suited for simpler projects with shorter timelines, as these are easier to measure and predict. Project selection involving a long-term project that is larger and more complex will be best approached using one of the five constrained optimisation methods outlined in the following sections.

Linear programming

Linear programming is useful when resources need to be optimised. In an office environment, linear programming can be applied to decide how tasks should be delegated and equipment should be used to reduce operating costs. The primary goal of linear programming is to find the values of variables that increase or decrease the value of an objective function (Hayes et al., n.d.).

Non-linear programming

When the rate of change in one or more project variables is not constant, non-linear programming can be used. This method should be used when there are a number of non-linear variables and several different possible options or outcomes. For example, when it comes to ordering new equipment, is it best to buy locally or to import equipment from overseas? What about buying second-hand equipment? Each of these scenarios has a different set of variables that needs to be factored in when calculating costs and possible variances over time. The option with the best overall ROI will be chosen.

Integer programming

Integer programming is best used for scheduling and is therefore applied when a project has a combination of both continuous and separate activities (Eudoxus, n.d.). The best application for this method is when there are many potential solutions, some way to measure the quality of alternative solutions and some connection between the variables that exist within the project.

Dynamic programming

Here, a project is broken down into a number of smaller sub-problems. A project is selected by considering the optimal solutions to sub-problems; the project with the least costly, simplest and most beneficial solutions to its sub-problems is then chosen. Dynamic programming is best used when there are a number of smaller tasks or problems within a project that must be directly addressed to determine the project's viability. Long and complex problems are best solved using this type of programming (Educative, n.d.).

Multiple objective programming

As the name implies, when a project has numerous different objectives, this particular approach is used. Considering only one objective at a time does not make provisions for other goals, and the achievement of one objective may therefore be to the detriment of another. For example, spending money on training staff, but failing to factor in the money needed for new equipment and software, can lead to major problems down the line. Multiple objective planning therefore simultaneously considers all the objectives in a project (Allothaimeen and Arditi, 2019).

The various constrained optimisation methods listed here vary in terms of their complexity and structure. Unless a project manager has experience with such models, they may need to hire one or more experts who have the technical skill and knowledge necessary to assist them in order to use these models effectively. If a project is complex in nature and suitably large, it is likely that the team rolling it out will need to be quite large. The project selection process may therefore require some sort of outsourcing or consulting so that the correct choice can be made. If the project manager does lack the knowledge and expertise, there are software programs that exist to assist them with project selection.

2.5 PERFORMING A FEASIBILITY STUDY

A feasibility study considers all of the elements that need to be included in a project and determines whether it is something that can be realistically achieved or not. In the following sections, we will discuss the details of feasibility studies in greater depth.

2.5.1 The importance and benefits of performing a feasibility study

In some respects, a feasibility study allows a project manager to visualise and execute a project in a simulated environment before committing any resources to that project's completion. A feasibility study is therefore a kind of test run of a project. If the project meets a number of key criteria, it is likely that it will be successful.

A feasibility study must be conducted in the correct manner. If the project manager does not follow a particular methodology and fails to consider all possible variables, then the chances of success are reduced. In addition, project managers need to understand that a feasibility study takes place in an idealised situation where all variables can be controlled. As a result, it is essential

that a project manager is objective when conducting these studies and that they factor in reasons why a project should not be pursued. If the disadvantages outweigh the advantages, then it may be best to reconsider going forward with the project. There are many reasons why project managers should conduct a feasibility study. According to *Think Positive* (2016), a feasibility study enables the following:

- *Provides focus for your project and outlines alternatives:* A feasibility study enables a project manager to focus their energies into areas that require their attention. It also allows them to consider alternative approaches and gives them the opportunity to explore other options that they may not have considered previously.
- *Narrows business alternatives:* By exploring a project's feasibility, a project manager can find a solution by removing non-viable or impractical solutions or approaches. In this sense, a project manager can narrow their options and move towards a final decision more rapidly.
- *Identifies reasons not to proceed:* A well-constructed study will provide a project manager with some reasons why you should not pursue a project. While it is good to be optimistic, failing to see negatives could be disastrous; all scenarios need to be considered when looking at feasibility.
- *Improves chances of success:* By identifying factors and variables early on, a project manager will be better prepared and 'expect the unexpected'. A feasibility study allows a project manager to adjust their psychology to anticipate a number of different outcomes and deal with them before they arise.
- *Gives quality to the decision-making process:* It is essential that a project manager completes a feasibility study before planning a project if they wish to make well-informed and well-thought-out decisions.
- *Serves as proof that the project selection process was properly researched:* A feasibility study is a document that a project manager can use as evidence to prove that they performed all of the steps necessary to ensure the success of the project. It will also allow the project manager to review the progress of their project if it moves forward to the planning and execution phases.
- *Assists in the attainment of loans and investment:* Investors and financial institutions are unlikely to give a project manager or an organisation funding for a project that cannot be proven to be feasible. These parties want to know that all of the possible outcomes have been considered. Due to this, a feasibility report is a tool that can be used to enable access to resources and additional support for projects and other ventures.
- *Allows you to mitigate risks:* A feasibility report is, in some respects, a preventative measure. The report should allow a project manager to identify potential risks and deal with them before they arise. Avoiding risks could save a company large sums of money, depending on the size of the project.
- *Is a roadmap for your project:* Because the feasibility study outlines so many critical details of a project, it acts as a map that a project manager can follow throughout the project management life cycle. It therefore effectively serves as a guideline that a project manager can consult at any time.
- *Gets all stakeholders 'on the same page':* It can be difficult to communicate the intricacies of a project with all of the relevant parties. However, a feasibility study can serve as a source of information for key stakeholders and team members. The document can be shared with them to ensure that everyone is informed about the details of the project and can align their expectations related to the project.

As is clear from the previous list, there are many reasons to conduct a feasibility study, as it can address many critical issues early on in the project management lifecycle. It is important to remember that feasibility is not necessarily determined by what is cheapest or most accessible. As explained in the previous example concerning the wall, using inferior materials for a building project or hiring a company that lacks technical refinement could end up costing your organisation more in the long term.

A feasibility study is not concerned about whether something can be done or not: it exists to determine whether something can be done well. The feasibility report therefore needs to focus on more than just one or two criteria to determine a project's feasibility. In the following section, we will discuss the different types of feasibility that exist and how they can be used to make a feasibility study more effective.

2.5.2 Types of feasibility

A project can only be considered to be feasible if it attains a satisfactory score in a number of different areas. According to Spacey (2017), there are seven types of feasibility.

Financial feasibility

Financial feasibility means using an existing budget and the best possible resources to create the most financially viable end product possible; it examines the viability of a project from a financial perspective. A financial feasibility study will consider aspects such as investment, access to loans, expenses, liabilities, present and future values, profits, taxation and ROI. This type of feasibility is considered to be the best way to compare different investment opportunities by examination of NPV and the IRR (*Income Marketing*, 2015).

A financial feasibility study allows a project manager to develop financial forecasts and predict the most likely outcomes for the project. Since most organisations exist to make a profit, it stands to reason that a project that is not financially feasible will likely be rejected or put on hold until the right conditions come into existence. Financial feasibility will likely involve the sourcing of quotes from various suppliers and service providers to ensure the best options are considered. Time-related factors are also important in a financial feasibility study, since wasted time is wasted productivity and, therefore, a financial loss.

Technical feasibility

Technical feasibility concerns the evaluation of existing hardware and software applications to achieve a project's goals. It measures how well an organisation can achieve the goals set out by a particular project from a technical perspective. For example, a company using old or outdated systems will likely have a difficult time trying to develop a new product if its competitors are using the latest technology and programs to create their offerings. In addition, equipment that is not properly used or maintained will likely fail and possibly cost the organisation a great deal of money.

If an organisation lacks technical capacity, it may need to outsource one or more functions in order to get the work done. This adds to the cost of the project. While it is not always possible to handle everything in-house, outsourcing can be expensive and does not always work out as expected.

Operational feasibility

This type of feasibility considers the overall operational and functional benefits that a project brings to an organisation. It looks at how well a project's outcome will satisfy the needs of an organisation and whether any developed infrastructure or systems will be used by its stakeholders (Freetutes, n.d.).

A project needs the buy-in of stakeholders in order for it to succeed. If there are employees or members of management that actively resist the changes brought about by a project, it is likely that it will be ineffective. If any stakeholders are negatively affected by a project, this must be taken into account. Key role players must be involved in the project to ensure it is feasible on an operational level.

Schedule feasibility

Many tasks are carried simultaneously (in parallel), and managers and employees have their own priorities to consider. Schedule feasibility focuses almost exclusively on time-related factors as well as the scheduled time needed in order for a project to be completed by a certain date. This type of feasibility is concerned with whether there is enough time to complete a project and whether it can be accommodated, considering the other projects and initiatives already taking place within an organisation.

In most cases, projects will need to be completed within a given time frame. For example, a company's annual general meeting (AGM) may take place in October every year, while a project to renovate a business's facilities may need to get started by June. The project will need to be completed at least three days before the company's AGM and the facilities must be shown to the business's top executives and investors. The project manager must establish whether the proposed renovations can be completed in the time available, considering the other projects and events already taking place at the company.

Market feasibility

A market feasibility study considers factors related to supply and demand, as well as customer perceptions, competitors and an organisation's position within the market. Some markets are volatile and prone to disruptions and sudden changes, while others are dominated by a few large entities. If a project involves the development of a new product or service, then it will not be able to succeed without some market research and preparation.

Project managers can interview existing clients as well as other stakeholders in order to gather information about their current perceptions and opinions of the company and its offerings. They

may even need to conduct more than one market feasibility study, if there is a plan to expand internationally. It may be that a product or service is well received in one market and totally ignored or even disliked in another. In many respects, a market feasibility study is difficult and time-consuming. There are often a range of variables that need to be considered, including the differences in audiences, contexts, cultures and perspectives.

Regulatory feasibility

A project will not succeed if it contravenes existing laws, standards or regulations. If there is a chance that a project may have undesirable legal implications, the project manager may need to adjust their approach substantially. As with differences in markets, laws and regulations vary depending on the country and/or region in question. In South Africa, laws and regulations can vary from one province to another. It is therefore essential that a project complies with local standards and regulations, or the company may incur legal penalties. Laws and regulations are subject to change, so it is imperative that a project manager keeps abreast of the developments in legislation applicable to their project.

Organisational feasibility

Organisational feasibility is very similar to operational feasibility, but is more concerned with the long-term psychological effects a project may have on the employees and other stakeholders within an organisation. Organisations are made up of people and those people have various interests, fears, concerns and hopes. For example, if extensive construction work occurs during office hours, employees may be unable to focus and may even feel unsafe as a result of all the activity taking place around them. This leads to an overall drop in productivity. Even though your office may look better, the trust and perceptions of some of the organisation's most important stakeholders are no longer intact. If a project is even seen to compromise the physical and/or psychological well-being of an organisation's stakeholders, it is not really feasible from an organisational perspective.

Knowing the different types of feasibility is critical, but how does one actually go about determining the feasibility and viability of a project? Many feasibility studies have been carried out in the past, so there are existing templates and steps that a project manager can use to determine the feasibility of their projects. It is important that a project manager knows the various steps that must be followed in conducting a feasibility study. This ensures that they follow tried-and-tested procedures that typically yield good results.

2.5.3 The components of a feasibility study

Now that you have some knowledge of the different types of feasibility that exist, it is necessary to learn about the elements that make up a feasibility study. According to Taylor (n.d.), there are six components of a feasibility study:

- an executive summary;
- a clear description of the project;

- analysis of the competitive landscape;
- operating requirements;
- financial projections; and
- recommendations and findings.

Executive summary

The executive summary is the first part of the report that will be seen by those who read including a project's most important investors and stakeholders. However, it is the last part of the report that the project manager puts together. This is because an executive summary is an outline of the other five parts of your feasibility study.

In principle, there are two different types of executive summary. One simply summarises a report while the other is a proposal or recommendation specifically designed to get the reader to take some kind of action (*The Telegraph*, 2015). The kind of executive summary a project manager chooses to use will depend on the nature of the project as well as the organisation's and stakeholders' requirements.

Executive summaries generally make up five per cent of the entire report or document, but they can be as much as ten per cent of the report's length. This means that if a feasibility report is 1000 words in length, the executive summary will be between 500 and 1 000 words. Project managers must take care to ensure that their summaries are not filled with technical jargon and that they can be easily understood by all of the stakeholders. It is also critical that the executive summary is ordered and structured according to the layout of the feasibility report. This will ensure that there is consistency and that the executive summary is effectively an abridged version of the full report.

A clear description of the project

Here, the project manager must plainly state the main ideas and objectives to ensure that the relevant parties can immediately understand the intricacies of the project. The project description should also include the roles and names of key stakeholders who were involved in compiling the feasibility study, as well as those who provided answers to important questions. It may be a good idea to include the names of suppliers, subcontractors, investors, employees and any other parties that were involved in the study. The project manager will need to obtain permission from these people to include their names and/or contact details in the study, since some stakeholders may wish to contact role players to obtain answers to any questions they may have. Not only is this a courtesy to the teams and stakeholders, but it also allows those involved in the feasibility study to be prepared to receive calls or other communications from investors or other parties once the study is complete.

Analysing the competitive landscape

Understanding what a company's competitors are doing is important, because their activities will have some effect on its strategy and approach towards projects. For example, if a competitor released a new product on the market that has taken considerable market share away from your

company, you may need to work on a new initiative to win back your market share by creating a new product and/or rebranding existing ones. This decision will most likely be up to the organisation's management, as they ultimately decide how strategy will be implemented.

There are usually numerous competitors in a market and it is difficult to predict what they will do at any given time. Each competitor will have their own value proposition, client base, aesthetic, brand and culture. While it is neither practical nor possible to consider every competitor, a project manager will certainly want to identify and understand a company's main competitors and their strategies.

In light of the competitive landscape, a project manager may want to conduct an analysis of their project's strengths, weaknesses, opportunities and threats. This type of analysis is also referred to as a SWOT analysis. For example, your project may have a high chance of success because you have an expert technical team that produces high-quality outputs. These factors would be your project's strengths. However, you may not have the required budget to achieve the result you want and the project may take longer than anticipated; these would fall into the 'weaknesses' category. Your project's potential to lead to market domination and give your company a definitive and long-lasting competitive edge are seen as opportunities. Factors in the 'threats' category may be uncertainty around regulations applicable to the product you are developing and the belief that your competitors know about your proposed new product. Although this may be a relatively simple example, it illustrates how a project's feasibility can be better determined using a SWOT analysis.



(Source: EDGE Learning Media (Pty) Ltd, 2020)

Figure 2.3: SWOT analysis

Operating requirements

A feasibility study must outline the resources, equipment and capital that will be required to complete the project. A project manager needs to factor in the human resources required to complete the product; each person involved will need to be remunerated and get time off to avoid having employees falling ill or injuring themselves while on duty.

Any equipment required must also be considered. Will existing equipment and machinery be sufficient? Is it necessary to buy new equipment or will it be better to rent some of the equipment to reduce operating costs? Keep in mind that equipment needs to be maintained; if a company purchases its own machinery and equipment, it will bear the cost of any repairs and maintenance that may arise. Equipment also needs to be stored when it is not in use. If the devices and tools are necessary only for a particular project, it may be better to rent this equipment than to purchase it.

Finally, costs will need to be calculated according to the project's schedule. The project manager will have to establish whether it would be better to complete the project over a longer period of time or whether it needs to be finished within a few weeks or months. Timelines and workloads, as well as the complexity and sensitivity of the work to be completed, have an impact on the cost of the project.

Financial projections

This is arguably the most important part of a feasibility study. Investors and other key stakeholders want to know the overall ROI of a project and whether the profits they derive will be scalable. Financial projections will typically include sales forecasts, break-even projections, cash flow statements, balance sheets and expenses budgets (Richards, 2019). If investors do not believe the ROI for a project is significant, then it will likely not be undertaken. Projects must be financially feasible in order to be approved.

Recommendations and findings

A feasibility study should conclude with all of the project manager's findings and recommendations if there are any. This section must address the items laid out in the other sections of the study (excluding the executive summary) and should be easy for any stakeholder reading the report to understand. The findings should all be based on solid research and strong arguments, and recommendations must be practical, as well as supported by strong evidence and a sound narrative. It may be advantageous for the project manager to provide investors and other stakeholders with a number of recommendations to enable the investors and stakeholders to consider the various actions that they could take.

A project manager should ideally present their findings and recommendations as soon as possible after completing the feasibility study. This should ensure that the information gathered is still relevant – quotations from suppliers and contractors are only valid for a certain period of time, and prices of equipment and labour can change without notice. For this reason, a project manager needs to inform their audience about the validity period of a feasibility study. They must make

clear that if action is not taken within a given period, it is likely that the information in the study will no longer be valid.

2.5.4 Conducting a feasibility study

While a feasibility report will be made up of the various components mentioned in the previous section, there are a few different phases or steps a project manager needs to consider when carrying out their feasibility study. Bridges (2019) outlines seven steps that should be followed when conducting a feasibility study.



(Source: EDGE Learning Media (Pty) Ltd, 2020; adapted from Bridges, 2019)

Figure 2.4: The seven steps in conducting a feasibility study

The extent to which each step is applied will depend on the complexity and size of the chosen project. Whatever the size of the project, the project manager must be systematic and thorough in their approach to project management. The following sections will explore each of these steps in greater detail.

Conduct a preliminary analysis

The first step in carrying out a feasibility study is an initial evaluation or preliminary analysis of the project. In the case of a new product or service, the project managers will want to see the products and services that are already available on both the local and international markets. Any products or services that may already exist and fulfil the need a proposed offering aims to fulfil must be taken into account.

The project manager must take the time to identify the cost of these products or services and the other needs that they may address. If the project manager finds that competitors already offer solutions that address a range of issues, the financial and technical feasibility of their offering will

be significantly reduced. However, if they are unable to find products like theirs, the project may stand a chance of being successful in the marketplace. A preliminary analysis should prevent a company from wasting time on a product or other venture that is simply not feasible.

Prepare a projected income statement

As Bridges (2019) points out, this step requires the project manager to work backwards. They will need to decide on the minimum desired income for the project and then determine the kind of investment that will be required. As this is a projected income statement, it may not be entirely accurate.

The project manager will need to take expenses such as wages, consultation fees, taxes, and costs, equipment maintenance, sundries and unexpected costs into account. Once they have estimated how much the project will cost and how long it will take, they should be able to figure out how much investment will be required. Projects that leave a business in a precarious situation will likely be rejected, so the projected income statement must reflect significant revenue and a ROI that is high and/or rapid enough to acquire the investment needed.

Conduct market research

The next phase is to conduct market research. This kind of work must be thoroughly and expertly carried out. If a company lacks the time and/or resources to conduct market research, it may be better to outsource the work to a business that specialises in market analysis and segmentation (Bridges, 2019). Whether the choice is made to conduct the research in-house or to outsource the task, market research will help in determining the overall revenue that can be expected to be generated by project.

The market research findings may affect the projected income statement and, as a result, it may be necessary to adjust the projections upon completing this particular step. If the project focuses on creating a new product or service, the target audience will need to be considered. It will be necessary to establish whether the product or service appeals to a particular age group and sex, as well as who will be able to access and make use of the offering and what it is intended to make them do or feel once they have made use of it.

Demographics is a key element in market research. This refers to statistical characteristics of human populations, such as age, gender or income, that are used to identify markets (Merriam-Webster, n.d.). A project manager must take these characteristics into account when carrying out their research to ensure that their offering reaches the right people at the correct time and in the appropriate places. The larger the project, the more thorough and professional the market research will need to be. If the stakes are particularly high, a significant portion of the project's budget will be dedicated to market research.

Plan business operations

As Bridges (2019) states, this is not a 'superficial, broad stroke endeavour'. Here, the project manager will need to look at their start-up costs; in other words, to identify how much initial funding will be

needed to start the project. High start-up costs could reduce a project's feasibility, so these need to be kept within a threshold to prevent investor discouragement.

A project might need to be run within particular departments or across the business's various departments. Property may need to be purchased or rented for a period of time for the project to be completed. Machinery and equipment needs, and transportation, shipping and overhead costs must be calculated. All of these items will need to be factored into the project's start-up costs and projected income statement. It is also necessary to source suppliers and establish the availability of raw materials to ensure that work can begin on schedule. Those employees working on the project must be briefed and any other human resources that need to be consulted or hired must be considered. All of this must be done in order to draw up an operations plan.

Prepare a balance sheet

Here, the project manager must estimate the assets and liabilities related to the project. Examples of assets include computer equipment, machinery, finished goods inventory, bond investments and building fixed assets (Bragg, 2019). Examples of liabilities include accounts payable, customer deposits, bonds payable, unearned revenues, salaries payable and income taxes payable (Averkamp, n.d.).

In order to prepare the opening-day balance sheet, Bridges (2019) recommends preparing a list that includes the name of the various items, their sources, the total costs and available financing. This should allow the project manager to prepare an adequate opening-day balance sheet to ensure that they are aware of the financial standing of the project from its outset. Preparing an opening-day balance sheet that considers all assets and liabilities reassures investors and key stakeholders that the project manager has done their due diligence. The project manager may wish to work with an accountant or bookkeeper here, but the size and complexity of the project will have some influence on this step and what goes into it. The nature of the assets and liabilities associated with a project will depend on the project and an organisation's current situation.

Conduct review and analysis

At this stage, the project manager will need to look back at the previous steps and determine whether there are any discrepancies or factors that they may not have considered. As the feasibility study is made up of various components, the project manager may need to do a fair amount of revision to ensure that all elements line up and that the research contained in the feasibility study is coherent and well thought out. This is also an excellent time for the study to be reviewed by an individual who has not been involved in putting it together.

When reviewing data, the project manager will need to verify all of the facts and figures contained in the study to ensure consistency. In addition, any out-of-date information must be duly updated or deleted. If there are a number of issues with the feasibility study, the project manager may need to revisit some of the previous steps, make adjustments and perform another review. It is important to check all of the study's sources and cross reference findings to ensure that it is accurate.

Decide whether to proceed

Once the feasibility study has been completed or reviewed, the project manager must decide whether the project is feasible. While this may sound simple, it is not always easy to determine whether a project will be worthwhile. In some cases, a project manager may feel that the project is viable, while the stakeholders disagree. If the stakeholders do not approve the project, the project manager will need to revisit their feasibility study and make adjustments to convince the stakeholders of the project's viability. Alternatively, the project manager may be asked to leave another project and conduct a new feasibility study.

The course of action will be determined once the project manager has their feasibility study. It will either result in the project proceeding to the presentation phase or the project manager may be required to restart the process of the feasibility study.

**EXERCISE 2B**

- (i) In your own words, unpack the concept of technical feasibility and what needs to be considered in such a report.
- (ii) Discuss the function, placement and structure of an executive summary in a feasibility study.
- (iii) In a table, briefly outline the seven steps when carrying out a feasibility study.

2.6 THE PROJECT PROPOSAL

After the project manager has carried out the feasibility study and it has been approved by all the relevant parties, it is necessary to put together a project proposal. The project proposal is used to 'facilitate a professional relationship' between a business and various external parties (Mavenlink n.d.).

The proposal is created to establish working relationships between an organisation and outside service providers; this includes consultants, suppliers, subcontractors and specialists. A project proposal therefore brings all of the organisation's internal elements and its external parties. There are various types of project proposals that can be used (Mavenlink, n.d.):

- **Formally solicited:** This type of project proposal is put together in response to an official request or order for a new project proposal. Here, a request for proposal (RFP) is compiled so that client expectations and other needs can be identified and stated. A formally solicited project proposal will then be put together to address these expectations and needs. An RFP makes the proposal creation process much easier. It clearly indicates all of the key details of the project, preventing ambiguity and uncertainty.
- **Informally solicited:** In this case, an RFP is not needed. As a result, there is no formal document to serve as a point of departure for the proposal. This makes the formulation of an informally

solicited proposal significantly more difficult. Informal proposals tend to lack details regarding goals, deliverables and a methodology. In short, an informally solicited project proposal is a request for a proposal that lacks specifics and clearly defined information.

- **Unsolicited:** These types of proposals arise when an employee devises a new project and approaches the business with the idea without having been requested to do so. These types of proposals require a high degree of refinement and research, as they are unexpected. They can be difficult to put together, since the project manager may need persuade stakeholders to support the idea.
- **Continuation:** A continuation project proposal is used to justify the continuation of an existing project. It is considered one of the easiest to compile, as it is simply a status update for key stakeholders regarding an ongoing project. A continuation proposal may be required so that resources can be directed effectively and the project can begin moving into its next phase.
- **Renewal:** The renewal proposal is used when an existing or ongoing project has been shut down or deferred because the resources and expertise necessary for its continuation cannot be used. The aim of a renewal proposal is to prove that the overall ROI is or will be greater than the total spent on the project, so that project-related work can begin again. A renewal proposal is therefore an appeal to investors and key stakeholders to reconsider their decision to abandon the project and continue to commit their resources.
- **Supplemental:** A supplemental project proposal is necessary when a particular project grows beyond what was initially anticipated. In other words, this type of proposal is used to indicate how the company plans to maximise returns and optimise outputs. Where unforeseen costs arise, this type of proposal will be compiled to request more capital and time to prevent the project from being terminated.

It takes time and effort to collate and present proposals. In addition to what we have discussed in this introductory section, we must consider the reasons for and value of these proposals. The following section will provide some insight into the utility and advantages of a project proposal.

2.6.1 The purpose and value of a proposal

Project proposals may be necessary to start new projects or expand existing ones. They may also be used to reopen projects that have been terminated or deferred. According to Mavenlink (n.d.), some of the main advantages of project proposals include:

- **Further demonstrating a project's feasibility:** A clear project proposal allows key investors and stakeholders to examine a project's details and determine its feasibility. By examining timelines and project layouts, stakeholders can have a clear idea about how well a project will work out.
- **Providing clarity about expectations:** Roles and key functions are assigned to individuals and teams within the business and outside of it. There are expectations that these individuals and teams are required to fulfil within a specified time frame.
- **Creating a framework for a project:** By creating certainty through laying out deadlines, roles and schedules, a project proposal is a kind of roadmap that allows an organisation to guide its efforts in a purposeful and meaningful way.
- **Creating more opportunity for funding to be obtained:** Project proposals that are well executed and presented are likely to receive more funding than those that are less professionally carried

out. More investment means that more can be done, meaning that the ROI should also be significantly higher for all involved.

- *Increasing the chances of success in the future:* A project proposal is integral in project development and significantly increases the chances that the project will be well received and successful in the long term.
- *Creating a method or template through which success can be achieved:* By integrating small project proposals into organisational activities, an effective method for achieving success can be developed. Project proposals are therefore tools through which excellence can be realised across the length and breadth of an entire organisation.

Project proposals are not the same as a business proposal (Mavenlink, n.d.). While a project proposal must be signed by key stakeholders and/or investors to show their approval, it is not a contract. This is because project proposals, unlike business proposals, do not contain legal terms and definitions and, therefore, are not legally binding. A project proposal does not formally obligate anyone to do anything; it is merely a proposed approach to a given project. The formalisation of agreements and legal requirements will take place after the project proposal has been approved by means of separate contracts and documentation.

Moursund (2002) also points out that a project proposal may be a major step towards the attainment of the project's final goal. This is because project proposals often involve a significant amount of research; for example, surveys and literature reviews. Gathering this data can take many hours, so simply putting a project proposal together may remove a great deal of the work required to achieve the project's intended objectives. In addition, a great amount of attention to detail is required when putting the proposal together, which is evident from the way that it is structured, written and presented (Moursund, 2002). Investors and stakeholders certainly want to know the general idea behind the project, but they also may want to know specific details. In the next section we will explore the various components of project proposals.

2.6.2 The components of a proposal

There are several methodologies that can be used when creating a project proposal. For the purposes of this unit, we will focus on the following (Levine, 2015):

- Project title (cover page)
- Project overview
- Problem statement and background information
- Project detail
- Available resources
- Resources required
- Evaluation plan
- Appendices

Project title (cover page)

There are some important factors that must be considered before deciding on the title of the project. First, the project manager must establish whether there is a specific format that must be

followed. This should be specified by management or the client (Levine, 2015). The cover page will include the signatures and names of key stakeholders, such as the project manager, a head of department and a supervisor. This shows that the proposal is official and has been reviewed by the relevant parties. If the project involves working with or alongside another group or organisation, it is common practice to include that organisation's or group's name and logo on the cover page.

The title is essentially a short summary of the project proposal. The project manager must put important focus words up front, followed by those of less importance. In addition, they should remove any words that are not necessary. Consider the following titles:

- *Title 1:* Old existing technology to receive total infrastructural upgrade to increase system efficiency
- *Title 2:* Upgrade of current system infrastructure

In the second title, superfluous information has been left out and the word order changed to place emphasis on the correct concepts. The title should ideally be a single sentence. However, if the project requires a longer description, the project manager can create a two-part title that sets out the main idea and the necessary elaboration, separating these concepts with a colon. For example, 'System infrastructure upgrade: proposed overhaul of existing technology and communication network'.

Project overview

The project overview in a project proposal is the equivalent of the executive summary found in the feasibility study. The project overview should contain all the main points and information, set out in a concise and logical way (Levine, 2015). The overview must indicate the project manager's awareness around the requirements being placed on the body from which they are requesting funding. Again, if there is some kind of collaboration taking place between an organisation and other parties, the roles and needs of those other parties should be acknowledged in the project overview. This is done to increase collaboration and build a sense of trust among the project's key role players.

In many respects, the project overview is the most critical part of a proposal. It is the section that is most likely to be read in full and, therefore, has the greatest chance of leaving an impression in the minds of the persons who read it. There are many possible areas that stakeholders may query; for example, the size of the project, the budget, the role players and the timeline. The overview should therefore allow the project manager to prepare for any opposition or questions that stakeholders may raise. The overview must reflect the most important parts of the proposal and enable the project manager to formulate answers to questions that may be posed. The more questions a project manager is able to anticipate and answer immediately, the more likely it is that their proposal will succeed.

Problem statement and background information

The problem statement and background information can be thought of as a literature review (Levine, 2015). In this section, the project manager must cite any sources they consulted while

compiling the project proposal. Information from similar past projects can also be included here. A project may not be entirely unique and another project manager or company may have accomplished something similar in the past. In some cases, a similar project may even have been embarked upon within an organisation, and the project manager would therefore be able to leverage these previous ventures. There are some definite advantages to this:

- The capacity to build on existing ideas and address other areas the project manager may have considered
- The opportunity to identify any mistakes or pitfalls in past projects and potentially avoid them
- Developing levels of teamwork and collaboration within existing projects and initiatives
- Ensuring the uniqueness of a project, since it will not follow the same steps as previous projects

The problem statement should be used to prove that a project is necessary and that it will effectively mitigate the issues it aims to resolve. The project manager will have to take the concerns of their investors and stakeholders into account when formulating the problem statement. It should summarise the issues and provide the audience with a very clear understanding of what the project will address.

The problem statement should advocate a long-term response that will save the organisation money and resources; if investors agree with the methodology or motivation, there is a good chance that the project will receive funding. This section should contain a list of the particular reasons why the project manager's organisation or team is best suited for the project. The project manager must state their areas of expertise as well as any other salient details, to show that their organisation and solution will be able to address the issue adequately.

Project detail

The following table outlines the main areas that require project detailing: goals and objectives, clientele, methods, staff and administration. The table contains the descriptions and questions used to analyse each area.

Goals and objectives	Clientele	Methods	Staff and administration
• Distinguish between goals and objectives • Goals = the desired end result (not measurable) • Objectives = operational targets (measurable) that inform project actions	• Who is the target audience? • Have you had any contact with them? • Have they been involved in the formulation of the project proposal? • Do you have the support of your clientele?	• Create a clear link between methods and objectives • Investors look for innovative, practical approaches • Project methods must show that the outcomes will add value to future projects	• Describe the roles necessary and persons responsible in the project • Outline how each role contributes to achieving the project objectives

• Try to overlap goals and objectives with those of stakeholders • Ensure that goals and objectives are realistic	• Are any other organisations involved with your clientele? • What do your investors need to keep in mind about your clientele?	• Are your chosen methods specific to your target audience? • How will your method encourage collaboration and get more people to contribute?	• Include names, titles, experience, qualifications and other important information • Your descriptions of people tell investors how competent each role player is • Provide evidence of teamwork and collaboration
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(Source: EDGE Learning Media (Pty) Ltd, 2020; adapted from Levine, 2015)

Table 2.4: The four subsections included in project detail

Available resources

All of the available resources at the project manager's disposal are detailed in this section. This may include employees, working capital, investment, equipment and machinery, as well as any other relevant supplies. As Levine (2015) points out, investors like to see collaborative efforts, since this means that various entities can pool their resources. When this happens, it reduces the amount of risk that investors take on.

A project manager should list any 'in-kind' resources that they may have at their disposal; this may include volunteer work from university students, advice from a local community member or access to facilities provided by an existing business affiliate. Detailing these resources shows investors that the project manager has done their due diligence and has a network of persons who will assist with making the project a success.

The project manager should elucidate whether any local resources have been included in the proposal. This demonstrates initiative and shows stakeholders that collaboration is a priority. In many cases, there are existing valuable resources available that a project manager may become aware of only after careful research and consideration.

Required resources

It is easy to overlook certain elements when planning a project. Dedicating certain resources and personnel to various phases can assist project managers with categorising their requirements and creating more structure in their project. In many ways, larger projects are simply a series of interlinked 'mini-projects'. Using this approach, a project manager can determine timelines, budgets, and facility and personnel requirements with a greater degree of precision and accuracy. This also takes a lot of pressure off of key stakeholders.

Personnel	Facilities	Equipment/supplies/communication	Budget
- Consider the staff/administration in 'project detail' and state the names of people to be paid by any invested capital - Include a brief description of each person along with an explanation why they are necessary in achieving the project's objectives - Consider using part-time staff members, especially if other organisations are involved in the project - Notify all persons in the proposal and get their permission before submitting the proposal	- A concise description of the facilities to be used in the project should be included in the proposal; even where additional funding is not requested - Any existing facilities that are freely available should be included as in-kind contributions - Any additional workspace, buildings or areas that are required for the project must be detailed with locations, prices and a justification as to why they are needed in the project	- Take care when listing equipment necessary for a project – investors prefer to fund personnel than the rental or purchase of equipment - Calculate the exact costs of needed equipment - Examples of equipment include computers, photocopiers, desks, chairs, special machinery and lamps - Consider the cost of stationery such as paper, pens, sticky notes, binders and paper clips	- The budget must be realistic and sensible - Have the project reviewed to verify how realistic it is - Is a large sum of money necessary to start? Can the funding be spread over a number of months? It is often more realistic to request the latter - Divide the project into phases to reduce costs - Provide investors with some control and options - Check whether specific funding categories are necessary for the project

(Source: EDGE Learning Media (Pty) Ltd, 2020; adapted from Levine, 2015)

Table 2.5: The four subsections within required resources

Evaluation plan

The evaluation plan outlines how the project will be evaluated and success determined (Levine, 2015). The project manager must prove to investors that their capital investment was sound. As a result, the project manager must conduct an investigation or study at the end of the project to establish what was done correctly and where improvements could have been made. Any additional documents that may be required to evaluate a project should be included in the appendices of the project proposal. For example, if the project manager intends to use a survey questionnaire to find out important answers regarding the project's success, a draft of the survey questionnaire should be included in the appendices section. If the project is suitably large, the evaluation plan will have to be somewhat broader. However, it does not need to be extensive at this stage of the project.

Formative and summative evaluation

The evaluation should make provisions for both formative (process) as well as summative (product) evaluation. Formative assessment is any information or feedback gathered while the project is being rolled out. It follows, then, that a summative assessment is the evaluation carried out at the end of the project to identify whether it achieved what it initially set out to do. In other words, the formative assessment is informed by the activities that occur within your project, while the summative assessment is based on the objectives and goals in your project proposal.

If the goals and objectives of the project have been clearly stated, the evaluation plan should be easy to put together. It is recommended that two separate but interrelated evaluation plans are created: one for the formative assessment and the other for the summative assessment. Additionally, the project manager should indicate how the project will be sustained after the funding period(s) has ended. They should identify whether other agencies will continue to contribute time and resources, whether there were any developments since the original proposal was compiled, how current initiatives will be managed and how such initiatives will continue. These and other questions should be addressed at the end of the evaluation plan so that key stakeholders know that every eventuality has been addressed.

Appendices

Appendices are 'secondary readings' for stakeholders and will likely only be reviewed by a handful of them (Levine, 2015). Here are some items that may appear in the appendices:

- Dissemination plan:** Investors often want to know how information from a project will be communicated to other audiences. The dissemination plan may include items such as television commercials, newsletters, social media posts, handouts, billboards and other marketing or advertising strategies. The more compelling and diverse the use of media in the dissemination plan, the more likely it is that investors will be willing to commit funds to the realisation of the project.
- Timeline:** This should ideally be presented graphically, with few words. The timeline should indicate the activities to be conducted at various times during the project as well as the times and/or dates by which work will be completed. If effectively rendered, the timeline will make the project appear more feasible.
- Letters of support:** Letters of support should be addressed directly to investor(s) and key stakeholders. It is essential to discuss the content of letters with letter writers before they start writing. Investors may be impressed by recommendations from prominent persons or agencies that show support for a project.
- Cooperating agency descriptions:** If the proposal has referred to any cooperating agencies, details about these agencies should be included in the appendices. A single page stating the name of the agency, key personnel and main activities/operations should be sufficient.
- Evaluation instrument:** Any drafts of questionnaires, surveys, interviews and other evaluation tools must be included here. There must be an indication that documents are drafts as opposed to final versions.

2.6.3 Guidelines for creating a proposal

You should now have a fairly comprehensive idea of what a project proposal encompasses. The previous section provided some good insights and relevant information, there are guidelines that need to be followed when creating a proposal. The following five points will assist you when putting a project proposal together (Enns in Ingram, 2017).

Proposals are only presented to key stakeholders and investors who are ready to buy

The project proposal is a highly valuable document and information contained therein should not be shared with a party merely because they are interested. It usually contains vital insights that should only be shared with parties that require them to carry out their project. A project manager must therefore ensure that the investors intend to invest in the project. If a project proposal is shared with untrusted or unqualified parties, the efficacy and exclusivity of the work is reduced.

Every proposal should be presented in person, via a videoconference or by telephone to the decision-maker involved in the project. Some organisations will require that proposals be presented to clients and not simply emailed or sent via post.

Proposals are verbal; contracts are written

A project proposal should be thought of as the main vehicle of a sales strategy rather than a formal written document. As Ingram (2017) states, the project proposal is used to get investor buy-in, or to provide reasons why they will not be buying in or not giving as much funding as required. It is possible to regard the written component of a project proposal as the background to the actual proposal, which is a public relations or marketing exercise that is conducted in person.

Project proposals provide a valuable platform upon which negotiations and discussions around the intricacies of a proposed project can be based. A written proposal, no matter how professionally constructed it is, will never sell a project as well as a project manager can. A project manager must exude confidence and professionalism when presenting to clients. This can be a daunting task and may require practice sessions before the actual presentation. While the proposal need not be perfect, it must be professional and expertly delivered.

'Price' comes before 'proposal'

While the budget and overall price are not contained in the first section of a project proposal, potential investors may immediately look for how much funding is required and sometimes make an immediate decision. Project managers often choose to discuss budget or pricing options upfront to prevent investors from rejecting the proposal. Avoiding talking about the cost of a project may raise doubts in investors' minds and discourage them from committing any funds.

It is crucial that any potentially contentious issues are discussed with key stakeholders. Being direct about the costs is vital and what is detailed in the proposal should be mirrored by what

is said during the presentation. The project manager making the presentation must know the budget and financials; they should also keep a copy of the proposal on hand in the event that they need to consult these figures during the presentation.

It is useful to divide a project into different stages or phases in order to identify key objectives and strategies for each one. Scalability is excellent because it provides the project manager and their client with options as well as a means of mitigating risks. For example, an upgrade to information and communications technology (ICT) infrastructure could be divided into three phases: the first would be an upgrade to the company's Internet and internal network, the second could be a hardware upgrade for key sales personnel, and the third could be the installation of new software that automates certain work functions. The advantage here is that these smaller projects make up one larger one and, because they can be done independently of one another, they can be reordered to suit the business's needs and investors' tastes. Dividing a project into phases reduces costs and increases its attractiveness to key stakeholders.

Proposals do not include specific solutions

While it might seem like a good idea to provide stakeholders or investors with specific solutions in a proposal, there are several problems with this approach. First, investors may steal your solutions and reject your proposal. To ensure the protection of the intellectual property contained in the proposal, the project manager must ensure that they do not provide too many details early on. Second, providing specific solutions may reduce the level of investor and stakeholder involvement, as they may be 'shut out' of the decision-making process in one or more ways. A general approach is always preferable, unless there have been specific instructions to provide specific solutions. For example, if you are attempting to gain funding from potential investors and have not been paid, you may wish to furnish them with your general expertise and experience rather than tailor-made solutions to their long-standing challenges.

Gain confirmation as soon as possible

Finally, a project manager should look to gain confirmation from their key stakeholders as soon as possible. They should make it known to their clients that they need confirmation in a specific order, namely verbally, in writing and financially (Ingram, 2017). Once verbal confirmation has been received, it will need to be formalised into a written contract.



EXERCISE 2C

- (i) List and briefly explain the six different types of project proposals that a project manager may encounter.
- (ii) Discuss the evaluation plan and outline the two different types of assessments that should be included.
- (iii) Why should you never email or post a project proposal? Justify your answer.

2.6.3 Guidelines for creating a proposal

You should now have a fairly comprehensive idea of what a project proposal encompasses. While the previous section provided some good insights and relevant information, there are several guidelines that need to be followed when creating a proposal. The following five points should assist you when putting a project proposal together (Enns in Ingram, 2017).

Proposals are only presented to key stakeholders and investors who are ready to buy

The project proposal is a highly valuable document and information contained therein should not be shared with a party merely because they are interested. It usually contains vital metrics and insights that should only be shared with parties that require them to carry out their duties. A project manager must therefore ensure that the investors intend to invest in the project. If the project proposal is shared with untrusted or unqualified parties, the efficacy and exclusivity of the work is reduced.

Every proposal should be presented in person, via a videoconference or by telephone to every decision-maker involved in the project. Some organisations will require that proposals be presented to clients and not simply emailed or sent via post.

Proposals are verbal; contracts are written

A project proposal should be thought of as the main vehicle of a sales strategy rather than as a formal written document. As Ingram (2017) states, the project proposal is used to get investor buy-in, or to provide reasons why they will not be buying in or not giving as much funding as required. It is possible to regard the written component of a project proposal as the background to the actual proposal, which is a public relations or marketing exercise that is conducted in person.

Project proposals provide a valuable platform upon which negotiations and discussions around the intricacies of a proposed project can be based. A written proposal, no matter how professionally constructed it is, will never sell a project as well as a project manager can. A project manager must exude confidence and professionalism when presenting to clients. This can be a daunting task and may require practice sessions before the actual presentation. While the proposal need not be perfect, it must be professional and expertly delivered.

'Price' comes before 'proposal'

While the budget and overall price are not contained in the first section of a project proposal, potential investors may immediately look for how much funding is required and sometimes make an immediate decision. Project managers often choose to discuss budget or pricing options upfront to prevent investors from rejecting the proposal. Avoiding talking about the cost of a project may raise doubts in investors' minds and discourage them from committing any funds.

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2.7 PROJECT MANAGEMENT IN PRACTICE

In this section, we will look at some examples of both 'good' and 'bad' project proposals using a practical scenario to illustrate the dos and don'ts when it comes to creating project proposals.

The following is an email sent by the owner of a technology hardware vendor to a potential client regarding the upgrade of the client's central file server. Study the content and note the indicators on the image.

Subject: New wares! [1]

From: Josh Smith <josh.smith@hardtek.com>
To: Florence de Beer

Hi Florence,

Thank you for the conversation we had last week. Following what we discussed, I would like to propose the following. [2]

Please note that this proposal does not include quality assurance or physically removing the old hard disk drives. This is because this will reduce the time available for more complex and time-intensive work. [3]

Here is my proposal:

- Schedule – three testing servers within two months, ten servers within three months. [4]
- Hardware – new pages for the website, just like those on the current website. [5]
- Total cost for the project, as specified above: R 85 000. [6]
- Payment conditions – 30 per cent upon signing the contract, 70 per cent after the work is finished.

How does that sound?

Best,
Josh Smith

(Source: EDGE Learning Media (Pty) Ltd; adapted from Frenkel, 2015)

Figure 2.5: Example of a poor project proposal

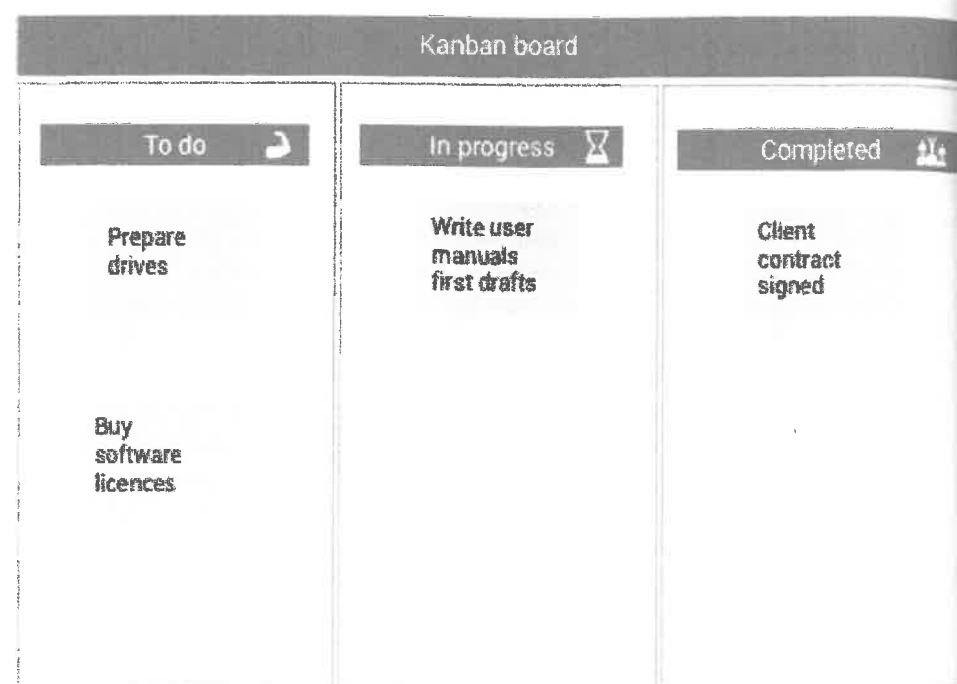
Can you identify the various problems here? First, a project proposal should never be emailed. As Frenkel (2015) points out, emails may be read in offices or workspaces, but thanks to smartphones people can read them virtually anywhere. If a project manager emails a proposal, there is a strong

possibility that the prospective client will not take the proposal seriously. Second, the entire project proposal is contained in four lines in the email. In the case of an organisation's website, where there is a great deal of content, the job will likely take at least a few weeks (if not longer). For this reason, the detail in the 'proposal' sent by Josh is not particularly professional or effective. Let's discuss each of the six points highlighted by the indicators in more detail:

1. Josh has given his project a vague title. 'New wares' is neither professional nor descriptive. In this case, he could have given his email the subject 'Proposed overhaul of [Company's name] website' or 'Website redesign/upgrade for [Company's Name]'. Reading the title of the email, the client would not immediately understand what the email intended to address. As the proposal was mailed and not given an appropriate title, the client would likely not take the proposal seriously or give it the attention it requires.
2. Here, Josh makes reference to 'the conversation we had last week'. This is vague and takes for granted that the client will remember all the details that were discussed in previous correspondence.
3. Josh states that the proposal he is about to give does not include quality assurance (QA). This is an omission and, as a result, he will not be able to provide any costings and be reimbursed for this work at a later stage. Josh cannot afford to skip QA, since overlooking this very important step will hurt not only him, but also his client. A complete proposal includes all required work.
4. The schedule specified here is unrealistic and includes no information about hours or activities to be performed at given times. In other words, this project has no clear timeline. Will work be done from 08h00 to 17h00? Will it include weekends? Or will work be carried out on an hourly basis? This point also ties in with the previous point. Does Josh's timeline include unbudgeted activities? Or is it simply for all the work included in the budget? Summarising a schedule into a single sentence is not good practice. A project manager must make it abundantly clear when work will be carried out and at exactly which dates certain activities will be completed. This ensures that there is no misunderstanding later.
5. Here, the work to be carried out and methodology are missing. Failing to specify the content of your work is a mistake, since the client will not know what is actually going to be done. A client may have certain expectations that may not be aligned to yours. Not providing a scope of work is unprofessional and could even lead to a breakdown in the relationship between the provider and the client.
6. This particular costing/budget specifies a lump sum of R 85 000. How did Josh arrive at that price? Since he fails to provide a schedule and plan in the email, he is risking losing money to unplanned or unforeseen work.

Kanban boards

A proposal that is less than a page in length and sent via email is insufficient. Josh should have done some preliminary work to visualise what he needed. This is where Kanban boards are useful. There are several different formats; the following board is an example of one that Josh could have used to make his proposal more accurate.



(Source: EDGE Learning Media (Pty) Ltd, 2020)

Figure 2.6: A basic Kanban board

A project proposal Kanban board provides categories that can be populated with key elements to be included in your project proposal. Simply by identifying keywords and deciding on important aspects that need to be addressed within a project proposal, Josh could have had a much clearer idea of what he needed to include in his project proposal. A copy of the Kanban board can be included in the appendices of a proposal to show investors how the planning processes unfolded before the project proposal was created. The reason why a Kanban board works so well for project proposals is because it allows a project manager to visualise their requirements and/or workflow. In this way, a project manager can get a picture of what they need to do in order to create an effective and accurate project proposal.

Kanban boards can also be used later in the project management life cycle. For example, when it comes to processes and activities, a project manager can create categories such as 'To do', 'In progress', and 'Completed'. This will enable them to visualise what activities are still waiting to be completed, as well as those that are nearing completion, are experiencing problems or are done. Kanban boards have multiple applications, so having some understanding of them is advantageous. Since they are very easy to create and lead to more in-depth thinking and strategising, they are a highly effective tool.

A project manager can use different methods when approaching the creation of a project proposal (e.g. a mind map or a concept map), but the point is that it is necessary to spend a fair amount of time planning how the project proposal should be prepared before putting it together. If you want to avoid the same mistakes that Josh made, then it is absolutely critical that you think carefully about what you want to put in your project proposal, as well as the exact order in which things should appear.

With everything we have discussed in this section, what exactly can we take away from this particular case study?

- **A project proposal must be planned:** A Kanban board works particularly well, since it allows you to think about each aspect of your proposal in a fair amount of detail before you actually compile it.
- **A project proposal must never be emailed:** This is completely unprofessional and will likely mean that your potential investors will not take you or your proposal seriously.
- **Your proposal should be more than a page long:** Even smaller project proposals should be a few pages long. In Josh's case, he could have prepared a complete project proposal if he had spent more time working on it. This would save him a great deal of time and money in the long run, as well as make his investors more aware of the project's requirements.
- **All work must be included in your proposal:** Never quote on a project without including all of the work you will need to do, unless you are happy to work for free. Your client will assume that you will take care of certain tasks at no charge if you do not include it in your costing.
- **You must be specific in your proposal:** Any vagueness will inevitably lead to confusion and most likely conflict down the line. You cannot afford to simply overlook something, no matter how insignificant or inconsequential you may believe it to be.
- **Ensure that you indicate exactly how you have worked out your cost:** Is it on an hourly basis? Will some tasks be a once-off payment or will there be follow-up payments? It is essential that you address these matters in detail.

It is important to remember that a project proposal must benefit you as well as your client. Make sure that you look after your interests and that you receive your due reward for the work you have done for your investors.

2.8 SUMMARY

The task of aligning a project's scope to an organisation's strategy can be laborious and time-consuming. Moreover, managing a portfolio of projects and keeping all of these in line with strategic objectives is similarly challenging. However, with the right approach and careful forethought, a project's relevance and feasibility can be determined and can prevent a great deal of difficulty for project managers.

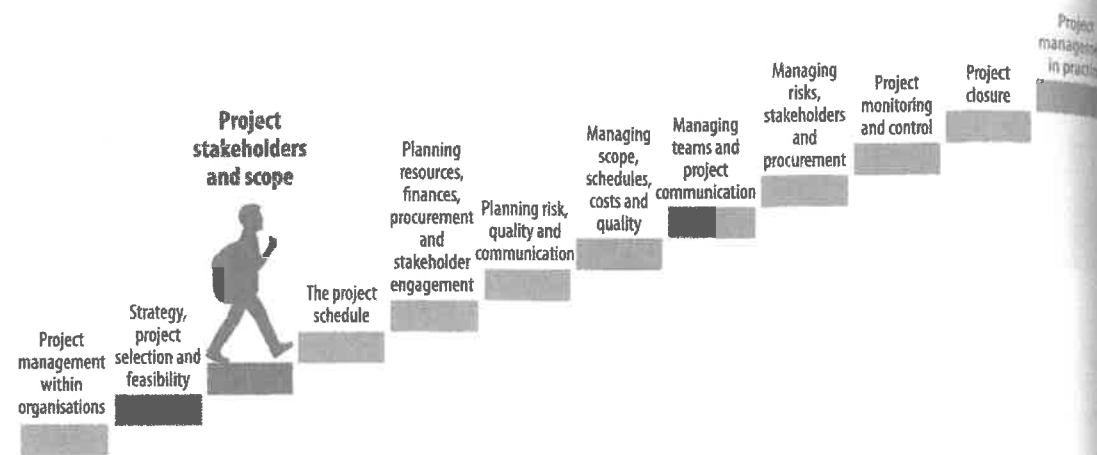
The initiation phase of the project management life cycle is a crucial one that requires a number of steps in order to determine which venture should be embarked upon. In this unit, you learned about the intricacies of two important project initiation documents: the feasibility study and the

project proposal. Having reviewed all of the content within this unit and examined the case studies, you should understand what is required of a project management professional. What should be emphasised is that neither of these documents should be overlooked or treated lightly – they are both critical project documents that are vital to the success of project(s). Ensure that you work methodically and consistently maintain a professional stance so that all of your proposed projects are accepted by your stakeholders.

3

PROJECT STAKEHOLDERS
AND SCOPE

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3.1 INTRODUCTION

Imagine that you are a project manager at a large industrial construction company. The management of the company have recently issued a call for proposals to refurbish a local heritage site. You are one of three project managers within the company who expresses interest. You decide to approach your best workers and ask that they commit to the project on a preliminary basis, so as to convince management that you have a willing and able team.

While writing your charter you think about who the stakeholders may be for a refurbished heritage site, and their possible roles when the project work is underway. You sit down with the team and discuss the work required to complete the project, carefully drawing up work breakdown structure (WBS) diagrams, writing down budget estimates, and designing a very convincing business case. When it comes time for the final decision, management review your project charter and clearly understand how your project will fit into the overall strategy of the business. In the final meeting, management are impressed that you have covered all the bases, and award the project to you. They sign off on the project and authorise you to begin.

The initiation stage in the project life cycle is one of the critical points that will determine whether a project will be performed or not. As a project manager you will be fully involved in creating the project documentation, and this will require many different skills that you will learn in this unit.

After studying this unit, you should be able to:

- explain the role and importance of project stakeholders;
- identify potential stakeholders in a project and the key characteristics of each;

- create a project charter;
- define a project's scope and highlight its purpose;
- compose a work breakdown structure (WBS);
- discuss important considerations for composing a project team;
- explain the process of reviewing the project initiation phase; and
- apply your knowledge of project initiation processes to both fictional and real-life cases and scenarios.

3.2 KEY TERMS AND DEFINITIONS

The following key terms and definitions are applicable to this unit:

- **Agile:** A method of management that seeks to make processes more efficient.
- **Organisational matrix:** A flat organisational structure that represents not only vertical (top to bottom) reporting lines, but also horizontal (left to right) reporting lines.
- **Ratification:** The formal signing of the terms of a contract. Project charters are often ratified before project work can begin.
- **Stakeholder:** Any person or group who can affect, or be affected by, the processes or outcome of project work.
- **Subject matter expert (SME):** A person who is very experienced or skilled in a particular area of work, who would be regarded as an expert to be consulted for advice or direction.
- **Task decomposition:** The process of breaking down a large task into its smaller subtasks or parts. This process is performed up until the point that the project manager finds the level of detail acceptable.
- **Work breakdown structure (WBS):** A depiction of the project work within a structured diagram. This diagram represents the task decomposition of the main project.

3.3 PROJECT STAKEHOLDERS

Project stakeholders are individuals or groups of people who would benefit or suffer as a result of the project work. They come in many forms, each with a different priority. In order to determine who is a stakeholder, we must think to what extent the project will affect people around it, and how far the horizon of the project's effects extends. Projects are usually performed in a changing environment, where various parties are trying to exert their influence and power on the work or the project team in order to get what they want.

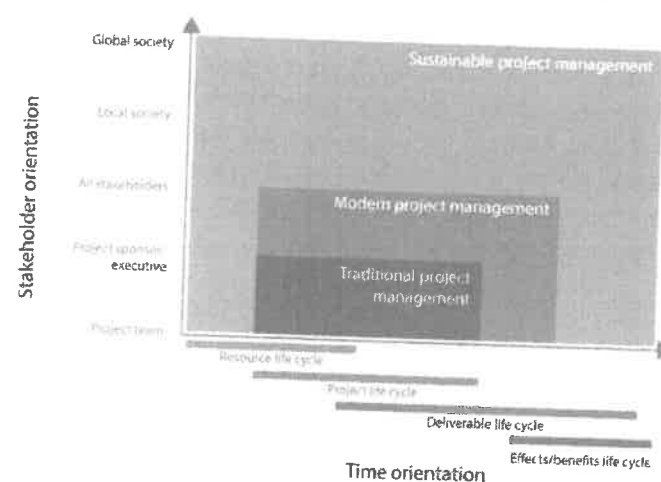
Why is it important to think about stakeholders in such detail? The answer is that the most important stakeholders determine whether the project is a success or failure, and these stakeholders can significantly influence the direction of the project. They can also have an immense impact on the organisation's ability to perform projects in the future, either through their financial investments or the public opinion they spread about the business. In order to make sure that your organisation can continue performing projects, you need to engage with your stakeholders, and the only way to do this effectively is by understanding them. The typical process of dealing with stakeholders is to identify them, analyse them and document them.

3.4 IDENTIFYING PROJECT STAKEHOLDERS

How do we know if someone has a stake in the process or outcome of our project? The easy answer is that we should tell them about the project and ask their opinions on it. This is not as easy as it sounds. We may not be aware of stakeholders that care very much about our project and similarly, there may be stakeholders who are unaware that we could impact them. Before we can communicate with any potential stakeholders, there needs to be a mutual awareness of the project work. We need to know that they exist, and they need to know that we exist.

The general process used to identify stakeholders is to think about the people who are involved in performing the project work. This includes the project manager, the project team, the business, and the customer. From here we slowly expand the circle of influence until we think we have covered the people affected by the project's processes or outcomes in some way or another. Those people within the circle will be considered stakeholders, while those outside of it will not. We also need to consider the fact that some projects have larger impacts than others, and this may mean that we need to consider stakeholders who are far removed from the project work itself.

For example, consider a project to run an oil pipeline through protected indigenous land. While the pipeline itself may not take up much physical space, the effects of any leakages or industrial activity on the local ecosystems could be particularly negative. The plants and wild animals in the area may have their habitats destroyed when land is cleared, the soil and the water supply may become degraded if the building materials used are not eco-friendly, and the community may be prevented from developing the land for their own benefit at a later stage. Traditional project management may not have considered these concerns in the past, as the primary concern was that the organisation deliver on the customer's needs and wants. In more recent years, we have seen a push for a more sustainable approach to stakeholder engagement. Consider the model of sustainable project stakeholder development shown in the following figure.



(Source: EDGE Learning Media (Pty) Ltd, 2019; adapted from Silvius and Schipper, 2019)

Figure 3.1: Sustainable stakeholder development and engagement model

On the x-axis (horizontal) we see various life cycles, such as the resource life cycle and deliverable life cycle. This represents the full period for which the process or product exists, and the effects on surrounding stakeholders. Each project management approach covers a different number of these life cycles; for example, traditional project management only considers the last part of the resource life cycle, the full project life cycle, and the start of the deliverable life cycle. It does not consider the effects/benefits life cycle – i.e. it is not concerned with long-term outcomes of the project. This axis is therefore labelled 'time orientation', as it relates to the orientation of the approach over time. The wider the area that is covered by the PM approach, the more life cycles the PM approach considers in its planning.

On the y-axis (vertical) we see different levels of stakeholders, such as the project team, or the local society. For example, modern project management covers the project team, the project sponsor/ executive, and all relevant stakeholders. Notably, the local and global society are not included in modern project management's view. This is because until recently, 'all stakeholders' referred to those affected by the direct impact of the project. Local and global societies are influenced by project activity in an indirect way; for example, if we choose to buy materials from another country instead of buying locally. It can also refer to future generations, who could be affected by the use of fossil fuels to perform project work, as this contributes to global warming. The higher the area covered by the project management approach, the more stakeholders it considers in its planning. This axis is therefore labelled 'stakeholder orientation', as it shows which stakeholders the respective approach covers.

As the previous figure shows, there have been three broad movements in the way project management identifies stakeholders:

- *Traditional project management* looked almost exclusively at the effect of a project on its direct stakeholders – those people who were involved in the project work, or stood to benefit/suffer personally as a result of the project's processes or outcomes.
- *Modern project management* took this one step further to identify the external stakeholders indirectly affected by project work – those people who could experience some level of change as a result of the project, but may not have been involved in performing the work.
- *Sustainable project management* is the most recent development in this area, and looks at stakeholders from the internal, external and global perspectives. These stakeholders can include global communities, international trading partners, natural environments or protected areas etc. You will also see that the stakeholder engagement in sustainable project management considers all of the cycles involved in the project processes: the resource life cycle, project life cycle, deliverable life cycle, and the effects/benefits life cycle.

If we think about the construction industry, modern project management would suggest that the relevant stakeholders would be the people who build the house, the people who are paying for the house to be built, and the local community in which the house is being built. Sustainable project management would extend this list to look at how the project's resources are being used, and what type of impact these resources might have on the environment. For example, certain building materials or industrial cleaning materials might soak into the ground and be absorbed

into a community's ground water. If these are toxic chemicals such as lead paint, which was used in many houses before it was banned in various countries during the 20th century, the environmental concerns of the project should be considered of high interest (United States Environmental Protection Agency, 2019). This is just one of the ways that project management has continued to think about how projects affect people's lives, and how project managers can reduce the negative effects and increase the positive effects of projects.

3.4.1 Finding stakeholders

Finding your project stakeholders is a process of investigation. You will need to ask yourself what the impact of the project will be on the people around you. You may also need to initiate conversations with various parties to find out what their interest is in the project, or how you might gain their support. Before we go on to outline the formal steps in the stakeholder identification process, it is helpful to consider the two broad categories that exist.

Internal

The first and easiest method for finding out who holds a stake in your project is to look at the organisation itself. These are stakeholders who work for the organisation directly, or will be direct users of the end product that the project delivers. They include parties such as:

- the project sponsor;
- the project manager;
- all project team members;
- general (line) managers;
- subject matter experts (SMEs);
- investors/shareholders; and
- customers.

These stakeholders are commonly involved in the planning and governance of project work, and would stand to benefit or suffer significantly from the outcome of the project.

External

External stakeholders are often more complicated to identify, and research may be needed to find out what sort of indirect or collateral effect the project may have. These are stakeholders that will be indirectly affected by the end product of the project, or may use the product at some point. They include parties such as:

- the local community;
- relevant government institutions;
- any industry competitors;
- outsourced or contracted companies;
- the natural environment; and
- marginal small businesses.

These stakeholders are not involved in the project work but may need to be informed about it in order to be satisfied. Some typical ways of dealing with external stakeholders include monitoring their status, providing progress reports to them, and consulting them about certain areas of the work if necessary.

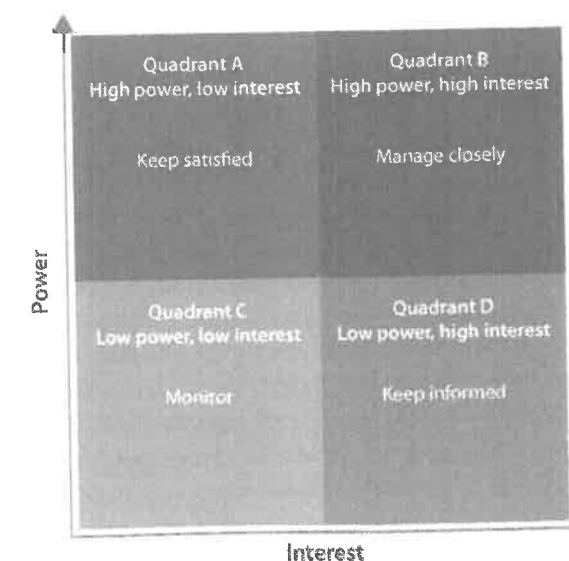
3.4.2 Performing a stakeholder analysis

Once you have identified your stakeholders, you will need to determine their relationship to your project. Are they likely to ask you to make a decision that will benefit them? Do they have any reason to prevent the project work from happening? These questions may lead you to understand the stakeholders better. The simplest way we can determine if a stakeholder is able to change the project work is by looking at their *interest* and *power*:

- **Interest:** Interest refers to the investment that the stakeholder has in the project; in other words, what they stand to gain or lose through the project's processes or outcome.
- **Power:** Power is the ability to make decisions without needing to consult others. It is also linked to influence, as powerful people can often persuade others to do what they would like them to do.

The tool that makes use of these particular characteristics is the power-interest grid, which locates stakeholders within one of four different quadrants (Meredith et al., 2017: 38):

Power-interest grid



(Source: EDGE Learning Media (Pty) Ltd, 2019; adapted from Meredith et al., 2017: 38)

Figure 3.2: Stakeholder power-interest analysis

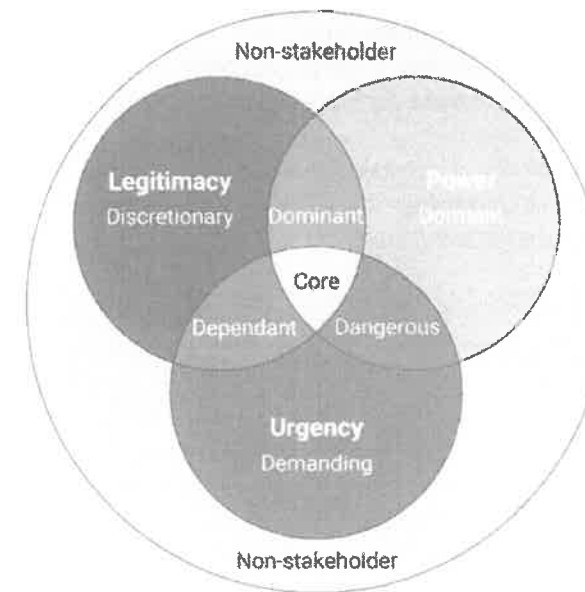
This diagram shows us that there are four quadrants that stakeholders can typically occupy. Along with the quadrants we are given recommended strategies that can be used to engage with the stakeholders.

- **Quadrant A:** High power, low interest. These stakeholders should be kept satisfied, and their needs should be met to an acceptable level.
- **Quadrant B:** High power, high interest. These stakeholders should be managed closely, as they have the ability to demand changes in the project work. They are also the stakeholders who will be most affected by the success or failure of the project.
- **Quadrant C:** Low power, low interest. These stakeholders should be monitored, as the project work is not relevant to them. The reason to monitor them is to determine whether they are changing in interest and power, and if they need to be moved to another quadrant.
- **Quadrant D:** Low power, high interest. These stakeholders must be kept informed about the project work, as they will be affected by the results or processes of the project.

For example, a local community could be greatly affected by a marathon that will be held in their town. There may be road closures and traffic, increased police or marshal presence, as well as litter created by the runners that would need to be cleaned up. The community would have a high interest in the project work as it would affect their lives, but would likely have little power to change the project unless they actively mobilise to oppose it. We would place this community in quadrant D (low power, high interest), and continue to inform them about changes such as road closures or times that the runners will be on the roads. By contrast, the municipality would also have a high interest (because of disruptions and road closures and potential revenue from the event), as well as high power, as their sign-off is required for the race to continue. They would therefore fall into quadrant B.

This model is a good place to start thinking about your stakeholders, and gives your project plan a simple and clear picture of who the project matters to. This will allow the executive management and project sponsor to determine how well you have accounted for third parties, and how they may seek to change the project work. Another method of analysing your stakeholders is to use the salience model developed by Mitchell et al. (1997: 874–878). The salience model presents a Venn diagram, which analyses the intersection of three different stakeholder characteristics: power, legitimacy, and urgency. We have already considered power, but legitimacy and urgency also have unique meanings in the context of project management that we must understand. *Legitimacy* is whether the stakeholder is at an appropriate level in order for their requests to be taken seriously (Usmani, 2020). *Urgency* is how quickly the stakeholder wants you to respond to their concerns, or if their requirements are time-sensitive (Usmani, 2020). Depending on the level of each of these three characteristics, we will classify our stakeholders under one of seven different labels (Mitchell et al., 1997: 874–878):

Salience model



(Source: EDGE Learning Media (Pty) Ltd, 2019; adapted from Mitchell et al., 1997: 874)

Figure 3.3: The salience model of project stakeholder analysis

Let's look at what these various positions mean in the context of a project, and how we should respond to the stakeholders who are in these positions (Mitchell et al., 1997: 874–877):

- **Core:** The stakeholder exhibits high levels of legitimacy, power and urgency. They are central to your project and must be managed very carefully.
- **Dormant:** The stakeholder's main characteristic is power, but they do not exhibit urgency or legitimacy, and so cannot act on this power. These stakeholders may develop these traits at some point, and they need to be monitored closely in case changes occur.
- **Demanding:** The stakeholder's main characteristic is urgency, but they do not have power or legitimacy to enforce their urgency. Even so, they are known to be demanding stakeholders as they put pressure on the project to produce results as fast as possible.
- **Discretionary:** A legitimate stakeholder who has no power to influence project decisions, and no urgent demands, is to be treated with discretion. This means that you can choose to keep them in the loop about project work, or you can decide not to do so if there is no need. Where their consent or expertise is needed, you would approach the discretionary stakeholder.
- **Dominant:** A stakeholder that has equal levels of power and legitimacy, but does not display urgency. This stakeholder may be able to change the nature of the project work or deliverables, but does not ask that these changes happen within a short time frame.
- **Dangerous:** When a stakeholder has power and urgency, they can be dangerous to the project. These stakeholders have the ability to make decisions and can create pressure by enforcing a limited time frame, so they should be accommodated where possible.

- **Dependant:** This stakeholder relies on you to make the decisions that are in their interest, as they have no significant power of their own. Their requests are urgent, and their authority to make these requests is legitimate. An example of this kind of stakeholder would be the project team who are closely involved in the project work, require timely responses to their requests but cannot themselves make decisions about how the project will work.

To determine the priority of our stakeholders, we will draw up a stakeholder matrix, which will assign a score to each stakeholder. This is done with a scoring model of 1 to 5, where 1 is low and 5 is high. Consider the following table.

Stakeholder analysis matrix					
Stakeholder	Legitimacy	Interest	Urgency	Total	Priority
Sponsor	4	4	4	12	Key
Customer	5	4	4	13	Key
Project manager	3	4	4	11	Key
Project team	3	3	3	9	Secondary
Contractor	2	1	1	4	Other
Local community	3	1	1	5	Other

(Source: EDGE Learning Media (Pty) Ltd, 2019)

Table 3.1: An example of a stakeholder analysis matrix

You will learn more about the in-depth methods used to analyse stakeholders later on in this textbook, but for this particular stage it is not possible or practical to perform more complicated analyses. The process of stakeholder identification and analysis in the initiation stage of the project is to prove to the sponsor and management that you are aware of who might be affected by the project, and how important each of these groups is to the ultimate success of the project.



EXERCISE 3A

- Explain how stakeholder recognition advances from traditional to modern, and eventually sustainable project management.
- Match the columns in the following table.

Stakeholder salience positions		
a. Dominant	1.	A stakeholder who is a risk to the project as they can ask for large, sudden changes to the project work.
b. Discretionary	2.	A stakeholder who has the power to make large changes, but does not often have the motivation to use their power.

c. Dangerous	3.	A stakeholder who relies on you to make decisions, as they do not have the power to do so themselves.
d. Core	4.	A stakeholder who wants their needs tended to fast, but does not have the power or legitimacy to enforce this.
e. Dormant	5.	A stakeholder who exhibits balance of power, legitimacy and urgency.
f. Demanding	6.	A stakeholder who has both power and legitimacy to make changes, but does not demand urgent changes.
g. Dependant	7.	A legitimate stakeholder who has no direct means to change project work, and no urgent demands.

- Consider the difference between the power-interest grid and the salience model of stakeholder analysis, and then indicate which would be appropriate to use when the charter needs only a basic level of detail.

3.4.3 Stakeholder documentation

The stakeholder register is the key piece of documentation that you will need to produce, as it has all the information that you will need to know in order to engage with your stakeholders. A very basic form of the stakeholder register is created and included with the project charter.

Stakeholder register					
Stakeholder	Priority	Description	Current position	Desired position	Engagement strategy
Project team	Key	Motivated by nature of work and happy to gain experience.	Leading	Leading	Monitor for changes.
Sponsor	Key	Currently interested in financial return.	Neutral	Supportive	Provide relevant motivators to increase level of interest in the project work itself.
Customer	Secondary	Not capable of evaluating the project work due to lack of technical knowledge.	Supportive	Leading	Provide a technical liaison, educate them on the project work with frequent briefings.
Community	Secondary	Local leaders are worried about the impact of the project on local businesses.	Resistant	Neutral/supportive	Negotiate with community leaders, offer involvement to consult in project planning.

Suppliers	Other	Contracted to perform delivery of materials.	Neutral	Neutral	Monitor for changes
Government	Other	One relevant regulatory code necessary to comply with.	Unaware	Neutral	Inform the stakeholder of the project and how it aims to meet the regulatory code.

(Source: EDGE Learning Media (Pty) Ltd, 2019)

Table 3.2: An example of a stakeholder register

Later in the planning stage, we will develop a stakeholder engagement plan. A stakeholder engagement plan is a more comprehensive document that will outline a specific engagement strategy, which will explain how you intend to move a stakeholder from their current position to the desired position within the project. It will provide detailed steps for how to achieve this, for example, inviting the stakeholder to sit in a planning meeting, giving them an information session about the technical aspects of the project, or sending them weekly updates about project progress. Stakeholder engagement also ties into the monitoring function that we will read about later on.

3.5 DEVELOPING A PROJECT CHARTER

The project charter is an early form of planning that is created during the initiation phase. It includes information about every area of project work that the sponsor and management should understand, details how much it will cost, and why it is worth performing. We use it to offer the project as a viable option for the relevant parties to consider, in the hopes that they will sign it off and allow us to begin the project work.

3.5.1 The purpose and value of a project charter

A project charter is the first official document that a project will produce. It is the document that will give permission to the project manager to begin using the project resources. Charters are used in the earliest stages to help businesses select a project from a group of proposals. As the charter includes broad details about the project as a whole, it allows sponsors to immediately tell if a project is likely to be successful, or if it looks like it will fail. The charter also informs on-board team members early in the process of planning, so they can get a sense of the nature and scope of the work. To move a project from the initiation stage to the planning stage, the project charter should be ratified. Ratifying a document means that it is officially signed by the parties involved, and becomes legally binding. In this case the charter is typically signed by the sponsor, project manager, and any executive management that need to sign-off permission for the use of resources.

3.5.2 The components of a project charter

Project charters vary greatly, as each business uses a method that works for them. Some businesses may even skip a project charter and move on to the planning process without needing to have an official document signed. This is more common in small organisations where executive approval is not needed, or the project may be so simple or routine that having project documentation could create unnecessary administration. However, there are elements that are common to project charters in various industries, and it is helpful to know the purpose of each of these elements. The following items should appear in some form on your project charter (Project Management Institute, 2008: 77; and Alam and Gühl, 2016: 67):

- **Project name:** The project should be given an easily identifiable name that will differentiate it from the business's other projects.
- **Executive summary:** A short summary of each element in the charter, so executive managers may review the project quickly. This summary should be accurate and informative.
- **Purpose:** The purpose of the project should be justified according to the strategy of the business. A short history of opportunities that brought about the project can also be provided here.
- **Brief description:** An overview of the project work with details about what this work will involve.
- **Assigned project manager and team:** The person who will be in charge of the project should be identified as the project manager. The team performing the project should also be identified. This allows management to see how the resources of the business will be affected if the project is approved.
- **Objectives:** The goals that the project will achieve during its life cycle; for example, staying within the project budget, delivering the project on a particular date, or developing a new work process as a result of the project.
- **Success criteria:** The criteria that must be met in order to consider the project a success for the business and the customer; for example, staying within budget would be a success criterion, as it means the customer will not pay more money, and the organisation will not be penalised for exceeding the budget.
- **Specifications:** The exact features that the project team must include in the project's product or service in order to consider the project ready to hand over to the customer.
- **Milestones:** Particular moments in the project life cycle that indicate significant progress has been made.
- **Budget:** The financial planning that determines how the project finances will be spent. At this stage the budget is a ballpark figure with a fairly large degree of inaccuracy.
- **Risks:** Any factors that pose potential problems to the completion of project work. These can be internal, such as the motivation of the project team, or external, such as the fluctuating cost of materials.
- **Approval requirements:** Any specific conditions that need to be met in order for the project to be approved by the organisational management and project sponsors.
- **Authorisation:** The project should be signed by the parties who are authorising the project work. This is typically the project sponsor, customer and any internal executive management.

Note that not every project charter will be exactly the same, so it is common that some sections such as the specifications and success criteria may overlap, or that the approval requirements and objectives may be described under a single heading. These are simply the elements that provide

unique pieces of information in a charter, and they each serve a different purpose. The following example provides a full charter that has a relatively detailed explanation of the project for which it has been developed.

EXAMPLE 3 A (Project charter)

The following illustration shows you how a typical project charter may look.

Project Ecogen Charter		2020
Project manager: Ngugi Garuba Project sponsor: Jeremy Marston		Designers: Ngugi Garuba Fabricators: Jeremy Marston
Executive summary		
South Africa is facing an energy crisis due to its reliance on fossil fuels and poor management of infrastructure. This project will develop an eco-friendly household electricity generator that runs on biodiesel. The project will run from 3 January 2022 to 20 December 2022, with a prototype being delivered every four months. The total cost of the project will be approximately R 570 000 and will require a team of seven people including the project manager.		
Purpose	Description	
To develop an eco-friendly generator that will compete with current fossil fuel generators.	The Ecogen project will develop a new biodiesel engine that can generate enough energy to power a single household. The project will be made up of two stages: design and prototyping. This will ensure that each specification in the project is clearly achieved. The engine will be modeled on existing technologies, but customised to fit a compact and efficient frame. This will be done through a series of improvements and streamlining.	
Success criteria		
- Product meets specifications - Project is within, or under the budget - Product can enter market within six months of development		
Specifications	Objectives	
- Biodiesel engine 5KW generation capacity - Tank capacity of 50 l - Must not exceed 50 kg dry weight - Double-sealed fuel tank - Roadworthy compliant wheels	- Eco-friendly generator - Must be reliable - Must be price competitive - Must be portable	
Risks	Budget	
- Competitor is developing a similar project - Cost of biodiesel is 1.5 times higher than petrol - Industry regulation to begin in two years	Materials Labour Overheads	R 100 000 R 350 000 R 120 000 R 570 000
Authorisation		Approval requirements
Project manager: <i>Ngugi Garuba</i> Project sponsor: <i>J. Marston</i> Executive manager: <i>Ngugi Garuba</i>		Project must align with business strategy Project must not exceed R 600 000 Ngugi Garuba must remain project manager

(Source: EDGE Learning Media (Pty) Ltd, 2019)

Figure 3.4: Project charter example

3.5.3 Guidelines for creating a project charter

It is essential that you offer an appropriate level of detail to the business members who will read the charter. If enough detail is not provided, they may think the project has not been carefully thought out and is therefore unable to achieve the customer's vision. However, too much detail could give the impression that the project would take too long to complete, as you appear more meticulous than is needed. A large or very detailed charter will also require more reworking when details inevitably change as the project progresses.

The requirements of the business should inform your approach. Any particular documentation that is standard should be completed and included in the charter, but make sure not to include information that is not critical to explaining the project. At this stage, only relevant information should be provided about the project.

Involve the team

Creating the charter can be a lot of administrative work, especially when you need to perform estimations about the cost and duration of project tasks. It is a good idea to consult the people who routinely perform the type of work that you are planning. They will be able to give you accurate estimates from the perspective of a subject-matter-expert (SME), and this is a credible way to estimate project costs and the duration of particular tasks.

Secure early commitment from the project team

The sponsor, customer, and executive management will be more likely to find your project charter credible if you have people who are signed onto the project. This can be particularly helpful if you need to demonstrate that the necessary skills to perform the work have already been acquired. This may also establish a sense of trust that the project will succeed, as the team have signed their approval of the work and have agreed to the general principles of the project.

Identify stakeholders as early as possible

It is beneficial to know your stakeholders from the earliest stages of the project process, for two main reasons. The first is that you can shape your project appropriately to find the best path of action to maximize positive impacts and minimize negative impacts for the stakeholders.

The second is that you have more time to engage with stakeholders and get them to the desired position that you would like them to inhabit. For example, if you find out that there is a protest group who has created bad publicity for similar projects, you may want to enter into communication and engage with this group as early as possible to reach an amicable solution.

Involve stakeholders where necessary

As a project manager you should see stakeholders as a valuable resource: there is a reason why they are interested or can influence the project and its processes. Sometimes this interest may be

purely financial or personal, but in most cases, you will have stakeholders that can help develop the project further by providing you with insight into the industry, estimations of costs, or even open doors to help you secure resources.

Practice sustainable stakeholder engagement where possible

In the modern world, people are becoming increasingly aware of the effect that our actions have on the environment and at-risk populations such as children, the poor, and previously disadvantaged communities. Sustainability can also refer to where your materials are purchased, whether you pay labourers at minimum wage or a living wage, and how your company treats employees in general.

Sustainable practices may have major effects on your project. The first is that they signal to your stakeholders that you have their interests at heart, but they can also bring in new stakeholders who may not typically be supportive of your projects. If the industry you operate in is known for using fossil fuels and non-renewable materials, being an ecologically sustainable business may be a major selling point to secure stakeholder support for your projects.

Sustainability also makes your business more robust, as the ability to perform business continuously is also a goal of sustainability. We must be able to foster a long-lasting relationship with stakeholders rather than considering them as a means to achieve the project or a barrier to be overcome.



EXERCISE 3B

- (i) Explore the difference between objectives and specifications, with examples.
- (ii) Indicate whether the following statements are true or false. (If false, substantiate your answer.)
 - a. Success criteria are internal measurements that do not concern the customer.
 - b. Ratifying a project charter simply means it is signed as a binding agreement between parties.
 - c. The project charter always has the same format, no matter which industry you are in.
- (iii) Stakeholders can sometimes offer value to the project processes. Discuss the benefits of identifying stakeholders early, and involving key stakeholders in the project planning.

3.6 DEFINING THE PROJECT'S SCOPE

When we talk about the scope of a project, we are referring to its size. Size in this instance does not only refer to the amount of work, but also includes the cost and time required to perform the work. Think of a magnifying glass, and how it focuses when held close to an object. A scope

does something similar, by drawing focus to a particular area of work that you aim to achieve, and leaving out work that you do not specifically need to achieve.

A scope may mention work that the project will explicitly not cover, so as to ensure that the stakeholder knows the limitations of the project work. This can be important when there are many specifications, but the scope is to only meet key specifications required by your customer. For example, if you are developing a dating app to sell on the Google Play store, there are many different features you could add. The number of specifications that you are required to achieve will typically depend on what your customer wants, what the industry standards or best practices are, the capacity and expertise of your project team, and the triple constraint. The triple constraint refers to the cost, time and resources associated with a project. Consider the following figure.

The triple constraint



(Source: EDGE Learning Media (Pty) Ltd, 2019)

Figure 3.5: The triple constraint

This figure shows us that the achievement of project quality is based on the balance between the three main constraints faced by every project: resources, cost and time. Each of these three constraints is related to the other, as a drop in quality could mean that we need to spend more money, time or resources to redo work that is not at the correct standard.

The cost of the project will involve all outgoing money that the business has allocated for project expenses. For example, costs can involve payment of staff, the purchasing of materials, fixing faulty deliverables that customers are unhappy with, researching best practices to improve project processes, or simply paying overheads such as rent and electricity.

The resources of the project refer to both human and non-human resources. Human resources are the people who work for the business or people who are specifically hired to work on the project. The availability of resources can impact project quality; for example, if an engineer is required on

three projects at the same time, they will need to split their time between each project. This will reduce the number of hours that they can spend on any one project.

The time available to perform the work may also raise the price of the project, for instance, if we need to hire more people to 'crash' the project schedule and perform the work in a very limited time frame.

The triple constraint is the combined effect of cost, time and resources that the project faces. There are other external constraints that we will consider later, such as international quality standards or government legislation, that require us to perform work in a certain way.

3.6.1 Planning scope management

Imagine that we are working on a project that is meant to last one month. After the first two weeks, we notice that work is going very slowly and we have only completed one week's worth of project work. At the current rate of work, we are performing at only 50 per cent efficiency, and we need to determine what will fix the problem. This is where scope management comes in, as we need to know how to approach situations where we have exceeded the scope boundary.

Scope management is the process of monitoring and adjusting the scope of the project, usually to compare the actual project performance to our original plan, or when changes are requested by the customer. To plan our scope management, we first need to decide on a method to monitor the scope, a method to adjust the scope, and who will take responsibility for each area of the scope. You will learn more about the methods of managing scope change, but for now it is important to understand that there are different approaches which are used for different types of scope creep (i.e. when the project's size subtly increases over time).

For example, if you are trying to speed up (or compress) the project schedule, you might reorganise the tasks so that some of them can be performed at the same time. You may also choose to add more team members to a task so it can be performed faster. Where schedules are concerned, the main point to remember is that we always want to address issues that impact the critical path of the project – in other words, the work that will determine the earliest date by which a project can finish.

The common goal of any scope management method is to bring the current scope in line with the planned scope. For example, if our project is spending R 10 000 more every month than initially planned, this is a significant move away from the planned scope. So, the scope management plan would identify how the scope will be monitored (for example, through weekly progress reports), how changes will be implemented (for example, by compressing the schedule), and who will take responsibility for each aspect of the scope.

3.6.2 Defining the scope

The scope of a project encompasses every piece of work that the project will achieve, and it also describes some work that the project does not intend to achieve. In other words, scope is

a boundary imposed on the project so that it does not continue without end. For example, an animal rescue shelter may run several outreach projects to find and rehabilitate injured or stray animals, but they need to set a boundary for their work. They probably would not travel to another province to pick up one animal, but may easily pick up a few animals near to the shelter.

The limits that are placed on a project, such as those in the example of the suburban animal shelter, are put in place to make sure that the project can meet its goals and not overextend itself into areas that it cannot, or does not intend to, address. Remember that a project is a unique, time-constrained endeavour, so it must be limited by specific boundaries. To gain a sense of the project size, cost and duration, you will need to perform estimates. At this early stage of the project life cycle, you will rely on broad estimates that have a high degree of uncertainty, and these will typically be based on previous projects of a similar nature and size. These estimates are intended to help the sponsor and executive management in charge of selecting projects to identify if your project looks achievable and aligns with their own constraints. One effective way of estimating project size and cost is to outline the work that the project will be performing. This allows us to see what sorts of tasks are involved, whether they are technical or straightforward, whether they will need special materials or resources that the project does not own, etc. To do this, we draw diagrams such as a work breakdown structure (WBS) to help us understand the structure and process of the work.

In agile project management, a project manager would meet with the customer to understand the work in detail, and to write up a user story. The user story explains what the customer wants to achieve. The project manager will create a set of requirements that the project team will need to meet in order to WBS breakdown structure, so it is a compatible method that complements traditional project management.

3.7 CREATING A WORK BREAKDOWN STRUCTURE (WBS)

The WBS is a diagram that illustrates how the project work will be organised. It relies on what is called 'task decomposition', which simply means that we take a task and break it down into smaller individual tasks again and again. For example, if we are building a product such as a custom car, we might categorise the work into mechanical, electrical, and body work. In each of these categories we would add in more detail until we have sufficiently described the work that must be done to achieve the work package. To draw a WBS we begin with the entire project at the top, and slowly break it down into the tasks required to build up the specifications that the customer requires.

A WBS can typically be presented in three different ways: as an outline, as an organisational chart, or as a concept map. We will take a look at the same example project and see how it would be presented in each of the WBS methods. The first is the outline method that places tasks into a multilevel list, where 1 would represent the entire project, and 1.1 would represent the first major work package in the project, and so on. An example of an outline structure for a WBS is provided in the following figure.

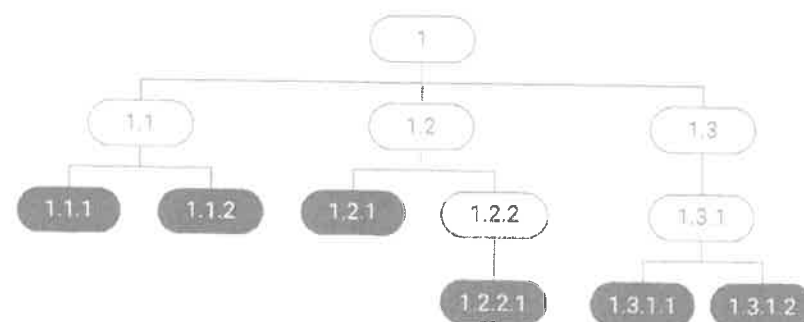
- 1 Project name
 - 1.1 Work package 1
 - 1.1.1 Task
 - 1.1.2 Task
 - 1.2 Work package 2
 - 1.2.1 Task
 - 1.2.2 Task
 - 1.2.2.1 Sub-task
 - 1.3 Work package 3
 - 1.3.1 Task
 - 1.3.1.1 Sub-task
 - 1.3.1.2 Sub-task

(Source: EDGE Learning Media (Pty) Ltd, 2019)

Figure 3.6: An example of a WBS in outline format

An outline may be acceptable for a small project that does not require executive approval. It is an early skeleton of project work that does not visually distinguish the task levels. It can also be useful to use an outline structure if there is a very strict logic that the project work needs to follow. The outline structure can also be presented as a table. Note: it is also faster to write a list than draw a diagram, and this can be particularly useful when there is very little time to create a charter that will be presented to management.

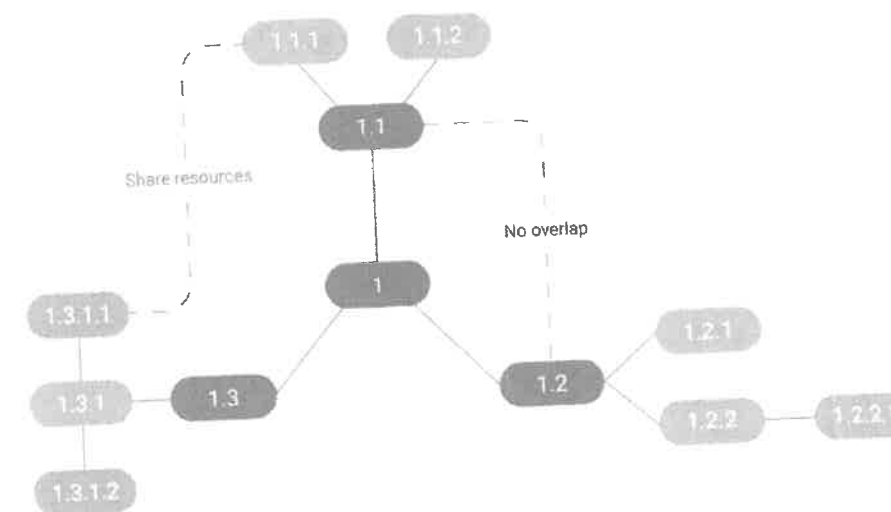
The second method of drawing up a WBS is to create a hierarchical (or organisational) chart which begins with the entire project and breaks up the tasks into levels. A full organisational WBS diagram is always preferred for regular to large projects. This is the most common form of WBS, and will likely be what a project sponsor is expecting to see if they ask you to produce one. The following figure provides an example of the same project as outlined in figure 3.6, now in the organisational format.



(Source: EDGE Learning Media (Pty) Ltd, 2019)

Figure 3.7: An example of a WBS in organisational chart format

The third structure we could make use of is a concept map. This method is more popular for agile project management, as it can show the relationships between tasks more freely than a hierarchical (organisational) chart can. Figure 3.8 provides an adaptation of Figure 3.7, to show how the same tasks might look in a concept map WBS.



(Source: EDGE Learning Media (Pty) Ltd, 2019)

Figure 3.8: An example of a WBS in concept map format

This form of WBS is appropriate to use when projects do not need to be completed in a linear fashion. In other words, there can be little to no task dependency, where new tasks can be started without waiting for other tasks to end. This means that multiple tasks could be completed at the same time if the project schedule requires it.

3.7.1 The purpose and value of a WBS

A WBS is drawn up in order to understand the work involved in achieving the scope, and to estimate time or budget allocations that will be necessary for each task. At the initiation stage in the project life cycle, the WBS should be simple enough to be understood at face value, while at the same time providing the necessary details that will help sponsors and managers to understand the scope of the project work.

The WBS is valuable because it describes task relationships that will help to schedule the tasks. Predecessor tasks, in other words, tasks that must be completed before new tasks can begin, form the very lowest level of the WBS. This is why the WBS must be created before even the roughest task schedules can be drawn up, because schedules require us to allocate time per activity or at least time per stage. It is also useful for understanding the number of project workers required, as well as the type of skills required to do the project work. Generally, the more detail you can

provide in a WBS, the more valuable it becomes, but it is also good to keep in mind that going into too much detail can lead you to lose track of the greater picture.

3.7.2 The components of a WBS

In the early stages of a project, such as the initiation stage, there are a few components that will be used to create the WBS. The typical components are work packages, level indicators, and links that indicate the relationship between tasks.

Work packages describe a particular piece of work that needs to be completed during the course of the project. The lowest level of work packages in the WBS (where the task cannot be decomposed any further) are collectively referred to as the critical path – these are the tasks that must be completed in order to call the project complete.

Level indicators refers to the numbering or lettering system used to show the level of decomposition for the task. In the outline shown in Figure 3.6, we can see that 1, 1.1, and 1.1.1 represent three separate levels of decomposition. Typically, the work of the project must be completed from the lowest level upward, so it is important to see which tasks exist at the lowest level.

Links indicate the relationship between tasks in the organisational structure diagram, and these lines usually run vertically (top to bottom). These links represent task dependence, otherwise known as task predecessors, which means that any lower level tasks linked to the present work package must be completed before the present work package can begin. In the concept map WBS, these links can represent different relationships, and they will typically be labelled. For example, if two tasks in different work packages need to share resources, the concept map can represent this with a link.

More specific details may be included if they are required by the sponsor or management, such as the cost of a work package, the resources required to complete the work, or the time allocated to complete a piece of work. However, a simple WBS will mainly explain the work itself and what will be required to complete it.

3.7.3 Guidelines for creating a WBS

A challenge that all project managers face when creating a WBS is to know when to stop decomposing a work package. It may make intuitive sense that the more detail we have, the better we are able to explain the work. However, if we add too many layers of detail, we start to lose the bigger picture. There are typical points that project managers from different disciplines use to stop adding levels, but the seven most common points cover a broad enough range to apply to most industries (Globerson et al., 2016: 66). These are:

1. *Organisational unit:* The smallest self-contained piece that the work can exist in. For example, if a task requires two departments to perform work, we might want to break this task up into its two organisational units (or in this case departments) performing the work. This way the work packages are divided due to the nature of the work being performed.

2. *Deliverable basis:* The work package can be delivered to the customer in its current form. For example, if your project will create three unique products, you can stop decomposing a sequence of work packages when it provides enough detail for acceptable delivery of one of the products.
3. *Scope of work:* The work package meets one of the requirements or specifications of the customer. The customer may ask for specific features or specifications for the project, and the work packages need to explicitly address the achievement of these specifications.
4. *Schedule estimation:* The work package reaches a reliable time estimate. The more we decompose a task, the more reliable our time estimation becomes, but only up until a certain point. We should stop adding work packages when the estimate is reliable for the current stage of the project.
5. *Cost estimation:* The cost of the work package can be easily and reliably estimated and allocated in the budget. Similar to schedule estimation, the task should be decomposed until we can confidently say that we know how much it will cost to do the work. We do not need to decompose the task further than the level of reliability required in the current stage of the project.
6. *Risk management:* The work package successfully resolves a risk that has been identified. For example, you may identify a risk that the customer would be unhappy with regarding the quality of a deliverable. In this case you may decompose the work package further to make sure that each feature that relates to a quality specification is dealt with and signed off as a unique task.
7. *Organisational guidelines:* The work package meets a requirement set by the organisation itself. This could be a quality standard, or a cost standard, but it is an internal guideline that the organisation performing the project has set. For example, a company may require that all products go through two rounds of testing before delivery. These tests would need to be included in the work breakdown structure.

These are the most common reasons why we stop adding further levels to the WBS. However, the most important reason is that the level of detail in the WBS should match the level of detail required by the stage of the project. In the stage we are learning about in this unit, the initiation stage, only a simple level of detail needs to be provided in order to show the sponsor and executive management what the general layout of the project looks like.



EXERCISE 3C

- (i) Explain what it means to develop a WBS on a deliverable basis
- (ii) Discuss the concept of task dependence, and provide an example of how it works.
- (iii) Adapt the following outline for a security update into an organisational chart WBS (you may use the numbering system instead of the task names to save space):

1. Security update
 - 1.1 Cameras

- 1.1.1 Wiring
 - 1.1.1.1 Old
 - 1.1.1.2 New
- 1.1.2 Storage
 - 1.1.2.1 Migrate
 - 1.1.2.2 Replace
- 1.2 Motion sensors
 - 1.2.1 Calibration
 - 1.2.1.1 Positioning
 - 1.2.1.2 Lighting
 - 1.2.1.3 Environment

3.8 COMPOSING THE PROJECT TEAM

Finding the right team can be a challenging aspect of managing a project. Not only do you need to meet the skills requirements to get the work done, you also need to find people who are team players and work well in group settings. Research into the effectiveness of teams in business found that 'as a whole, team performance is improved when members have high cognitive ability, desirable personality traits, and relevant expertise' (Stewart, 2006: 45). In other words, you should be looking for smart, pleasant and experienced people to be on your team. However, it is useful to break these qualities down into specific traits that we can identify in a 'first class' team member (Garris, 2007: 35).

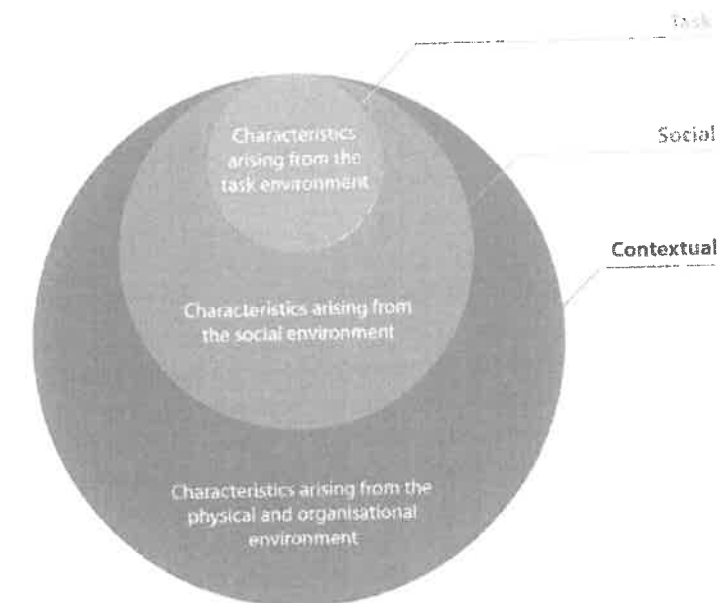
- Communication and listening skills
- Technological competence (including relevant software knowledge)
- Customer focused
- Relevant project work experience at similar scope
- Knowledge of best practice within the industry
- Good reputation within the industry
- History of meeting functional objectives
- Creative problem-solving skills
- Familiarity with sustainable practices
- Ability to justify changes on previous projects
- Fair/reasonable fees (particularly for outsourced team members)

As we can see from this list, both technical and interpersonal skills are essential to look for when selecting team members. What happens when we do not have someone with the qualities we need? In this case we might want to consider outsourcing, which is when we hire someone from outside of the business so we can make use of their skills or qualities for the duration of the project.

Next you will need to consider how many team members you will need. The number of team members will often depend on the scope of the project itself. Larger teams do not always result in better or faster work, but it has been generally proven that larger teams work well for projects, and that the average number of project team members per project is seven (Stewart, 2006: 45).

The tendency to focus on describing work exclusively in terms of the tasks to be performed, or even the greater strategy of the business, has led some scholars to develop what is called an integrative framework for work design. This framework considers the effect of three spheres of influence that must be considered when designing work and describing roles for team members, namely the task, social and contextual spheres (Morgeson and Humphrey, 2008: 52):

Integrative framework of work design



(Source: EDGE Learning Media (Pty) Ltd, 2019; adapted from Morgeson and Humphrey, 2008: 80)

Figure 3.9: Morgeson and Humphrey's integrative framework of work design

This framework shows us that the core of team and work design is at the task level. We must clearly establish what we need our team members to do; in essence, the requirements or specifications of the project. We must also ensure that we are able to accurately assess the capacity of potential team members to see if they can do what will be required.

The second aspect of work design includes the characteristics that govern how a team member will interact with their social world, which in this case, refers to the other team members and the organisation.

The third aspect we should consider is the context of the work. This includes the strategy of the business, the industry that we are operating in, as well as the location and timing of work and how this will affect the team's ability to do their job.

Considering these three areas when finding a project team with the correct requirements will be of great benefit.

Importantly, your project team will have expectations of you as a leader too. Some of the common expectations that teams have of the project manager include (Garris, 2007: 37):

- The creation of a positive team atmosphere
- Expressing their needs and desires
- Gaining respect of upper management
- Having the ability to make decisions, and understanding the limits of such power
- Having a short turnaround time for approvals
- Providing feedback to team members in a timely manner
- Having relevant knowledge of the work
- Attending all critical project meetings
- Minimising the reversal of decisions or the change of direction where possible
- Remaining open to ideas and criticism from the team
- Acting as a voice for the organisation

3.9 REVIEWING THE INITIATION PHASE

There are three main objectives that you need to achieve by the time the project initiation phase is over. These are: the assignment of a project manager, the completion of the project charter, and a statement of constraints and assumptions (Webster, 2000: 121). You have learned about the different elements of a project charter and how they are used to describe the project as a whole, so we will now briefly discuss the types of constraints and assumptions that project managers will typically consider before the formal planning stage begins.

Constraints

The three most important constraints of time, money and resources have been covered earlier in this unit, but there are other constraints that the project may need to consider. These may include government policies, global industry trends, environmental changes, economic fluctuations, and more. For example, we might be constrained by a monthly limit that is placed on the import of a particular rare resource. This could mean that we have to extend the project to accommodate several smaller imports over time, which may increase the cost of the project. Any factor that could influence the processes or output of the project should be listed in the charter to signal that you know how the project can remain successful despite possible constraints.

Assumptions

Assumptions are statements about what we believe will happen in the future, based on our experience and knowledge. For example, if we know that an industry has high volatility (it is very likely to shift upward or downward in value) we can assume that there will be times when it is at a high value and times when it will be at a low value. This assumption could mean that we calculate our costs when the industry is at low value (meaning the resources will be cheaper to acquire). Here is another possible assumption: a recent election is likely to decrease the value of a national currency, as political change is often associated with a drop in the exchange rate for the country involved (Mohammed, 2017). These assumptions will give the sponsor and management an idea

of how we have developed the project in relation to factors outside of the business, and how we are using them to plan appropriately.

3.10 PROJECT MANAGEMENT IN PRACTICE

The following scenario is a fictional example of the development of a project charter, made in response to a public tender by a wealthy investor.

LifePharm are a private pharmaceutical company that develop prescription drugs for the medical market. They have recently come across a public tender launched by a wealthy investor, Kathryn Lang. Lang is a businesswoman who made her millions from writing study guides for some of the most difficult concepts in mathematics and engineering, and these books have helped many students pass their studies on time without needing to take an extra year. She is a philanthropist; in other words, she enjoys investing time and money in the improvement of humankind.

Lang would like to further research into a drug that helps students to concentrate on their studies, as she knows first-hand how difficult it can be to focus on complex concepts for long periods of time. She has created a very generous sponsorship of R 750 000 to develop a drug called Concentratium. The winning company will be responsible for taking the drug from the research stage all the way through to production and marketing over the course of two years. She requires the project to reach three key milestones during this time:

- After 6 months the research must indicate the viability of the drug
- After 20 months the development of the drug must be complete with South African Health Products Regulatory Authority (SAHPRA) approval
- After 24 months the marketing plan must be ready so the drug may be advertised on the market

LifePharm immediately set to work creating a project charter that will win Ms Lang over, and secure them the tender. The project manager Nicola begins to write up some of the basic initiation documents needed to form the project charter. She starts by listing all the project team members likely to be needed on the job:

Project team for Concentratium	
Management	
Executive manager	Jason
Project manager	Nicola
Research	
Pharmaceutical scientist	Rama
Psychiatrist	Outsourced
Academic researcher	Brendan
Development	
Pharmaceutical scientist	Rama
Pharmaceutical scientist	Safia
Medical doctor	Catarina

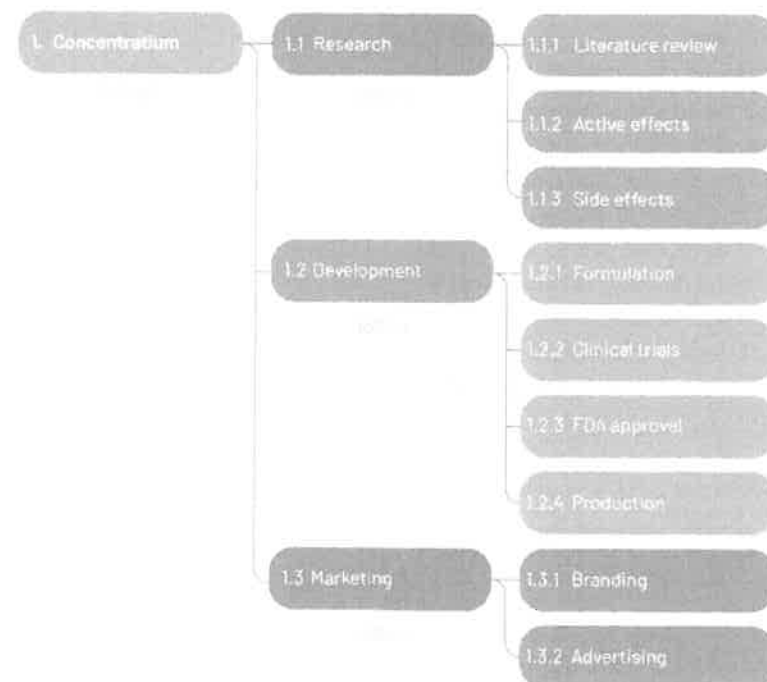
Marketing	
Media correspondent	Jeremiah
Graphic designer	Outsourced
Videographer	Outsourced

(Source: EDGE Learning Media (Pty) Ltd, 2019)

Table 3.3: Project Concentratium team register

This register will help the sponsor see that the company's members have the relevant skills to do the work, and that they are able to acquire the skills they do not have. You will see that each role is linked to a particular employee, and roles that LifePharm do not have the capacity to perform are marked as outsourced.

Nicola then outlines the workflow that they will follow by drawing up an organisational chart WBS, which is broken up into three main stages: research, development and marketing. She does this with the help of the staff she has identified for each stage, and relies on their knowledge to estimate task times and create a logical flow in the structure of the project. The following figure illustrates how these main stages have been decomposed into nine unique work packages that make up the critical path of the project.

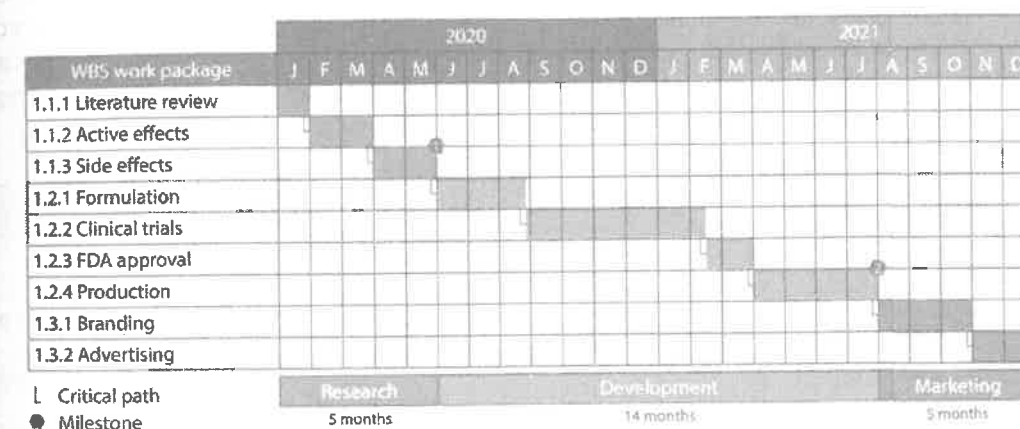


(Source: EDGE Learning Media (Pty) Ltd, 2019)

Figure 3.10: WBS for project Concentratium

As the work process is strictly linear, Nicola is able to sequence the tasks one after the other in order to see how long it will take to reach each milestone. In order to track these tasks across a broad timeline, she uses an appropriate programme to input the percentage of time allocated to each task. This will automatically fit the tasks into the 24-month schedule.

Scheduling is a function of planning, and as the project requires a large amount of money from its sponsor, the charter needs to be comprehensive if it is to convince the sponsor that their money is in good hands. The following figure presents the Concentratium project in a Gantt chart format, indicating the critical path and milestones that will need to be achieved.



(Source: EDGE Learning Media (Pty) Ltd, 2019)

Figure 3.11: Gantt chart for project Concentratium

You may notice that the research stage is shorter than the first milestone requirement that Lang established in her tender. Nicola has compressed the research stage of the project as it will give Lang an idea of the feasibility of the drug earlier, which could save money if the results are not in her favour. The rest of the schedule cannot be compressed, however, as the marketing department is not as strong as other areas of the company.

In order to break down how the sponsor's money will be spent, Nicola decides to draw up a balanced budget. Her budget estimates rely on the historical method, which looks at previous research projects that fall within a similar scope. Using this method, she is able to provide a basic income and expenditure projection for the project.

Income		Expenditure	
Internal funding	R 100 000	Materials	R 100 000
Sponsorship	R 750 000	Labour	R 550 000
		Overheads	R 200 000
Total	R 850 000	Total	R 850 000

(Source: EDGE Learning Media (Pty) Ltd, 2019)

Table 3.4: Balanced budget for project Concentratium

The overheads and labour make up the majority of this project because it involves many hours of research on very small doses of medication, and the expertise required to perform the work is quite costly. Based on these numbers alone, we can see that the project sponsor would be interested in the project's processes and outcomes. They would have a lot of power due to the fact that they are funding nearly 90 per cent of the project. The failure of the project would cause a larger loss to the sponsor than the business, so it is natural that they would want to be involved and make decisions about the project's governance that would lead it toward success.

While thinking about these issues, Nicola draws up a basic stakeholder register to outline the priority and engagement that she would need to assign to each party with a stake in the project. This covers a wide range of stakeholders and how they could be engaged by the project team in order to get them to the desired position. Nicola hopes that her thorough approach in creating the project charter will be enough to secure the tender.

Stakeholder register					
Stakeholder	Priority	Description	Current position	Desired position	Strategy
Kathryn Lang	Key	Large financial investment, wants to be very hands-on.	Leading	Supportive	Assert legitimacy of researchers, keep updated about work progress.
Project team	Key	Hesitant about learning curve involved.	Supportive	Leading	Offer incentives to staff in the form of publication accreditation for the research.
Psychiatrists	Secondary	Prescribe medications such as Ritalin regularly.	Supportive	Leading	Offer trial partnership with eligible patients.
End-users (students)	Secondary	Do not have a particular preference for medication, but would benefit from the project.	Neutral	Supportive	Involve students in trials to prove that the medication can help them.
Suppliers	Secondary	Suppliers of raw materials are ready to deliver when needed.	Neutral	Neutral	Monitor status.
Competitors	Other	Other pharmaceutical companies who were not awarded the tender.	Resistant	Neutral	Possibility of sharing the opportunity by contracting staff from competitors.
Universities	Secondary	Most universities do not know about the project.	Unaware	Supportive	Offer partnership and possibly subsidise medication costs for students.

(Source: EDGE Learning Media (Pty) Ltd, 2019)

Table 3.5: Stakeholder register for project Concentratium



EXERCISE 3D

Consider the case study of LifePharm and the Concentratium drug development project.

Required:

- In your opinion, do you think a higher level of detail for this project charter is useful? Justify your answer.
- Identify which of the project documents in the initiation stage would need to be changed if the project manager had underestimated the total cost of the project.
- Discuss how the scope was determined for this project.
- Unpack some of the concerns that a project manager would need to consider about the resource life cycle of Concentratium; in other words, how the drug is made. Use the sustainable project management approach to stakeholders.
- Explore some of the concerns that a project manager would need to consider about the deliverable life cycle of Concentratium; in other words, how the drug is used. Use the sustainable project management approach to stakeholders.

3.11 SUMMARY

We have covered the initiation stage of project management in some detail, and you should now understand how and why the project charter is used. Bear in mind that not every company will use the exact templates that you have learned in this unit, and you may even come across companies that choose not to make use of charters and other initiation documents. If you do find yourself in a position like this, keep your eyes open for the typical elements of planning that you have learned. The tools in this unit are universal to project management in any industry, though you will always need to understand them within the context that they are applied. Feel free to return to this unit when approaching a new project, and match the processes that you are required to follow with the tools you have learned.

PART ③ PROJECT PLANNING

Part 3 comprises the following three units:

Unit 4: The project schedule

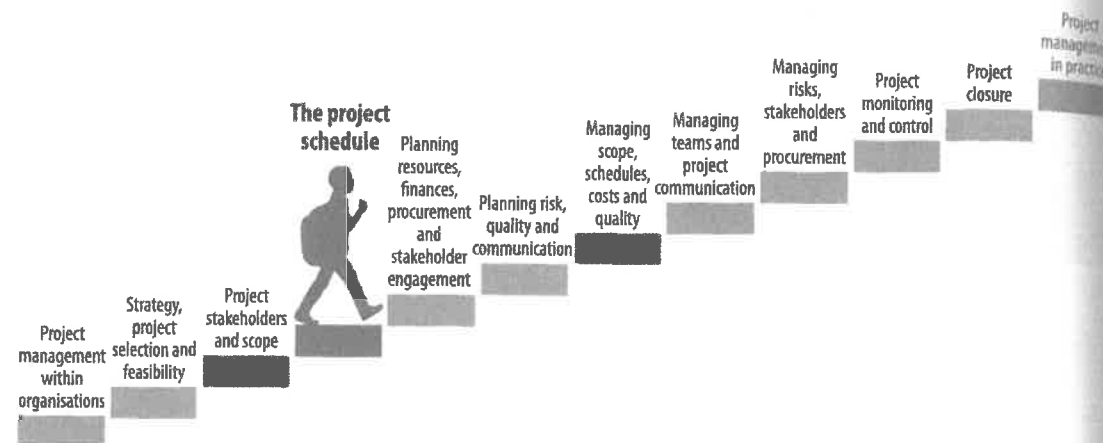
Unit 5: Planning resources, finances, procurement, and stakeholder engagement

Unit 6: Planning risk, quality and communication

4

THE PROJECT SCHEDULE

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4.1 INTRODUCTION

Imagine that you are given a work breakdown structure (WBS) by your project manager, and that it has more than 50 different tasks on it. How will you manage to show the relationship that each task has to another, as well as when each task must be carried out? Regardless of the size of your project, it is important to create a precedence diagram, such as a critical path network. This will enable you to determine which tasks are the most important to complete on time, and which tasks can take a little longer if needed. It will also provide an important visualisation of the project workflow for the team performing the work. This will help them to understand the time frame that their tasks will need to fit into.

Efficient planning is vital to the success of a project. The planning process includes many steps and actions, all of which need to be completed successfully before the plans are put into action. Having a plan helps to ensure that the project is completed on time. However, with a complex project, it can be difficult to identify the key tasks and the order in which tasks need to be performed. Today, there are many different techniques and tools that can assist a project manager in planning and managing a project. Being aware of these tools and knowing how to use them is vital to ensuring that a project is completed successfully. In this unit, we will discuss some of these tools and techniques. First, we will explore the critical path method (CPM), and then move on to milestones, baselines and Gantt charts.

After studying this unit, you should be able to:

- demonstrate a working understanding of the 'critical path' of a project;
- produce a network diagram;

- identify the critical path of a project;
- calculate project timelines, as well as start and end dates for a project;
- prepare a Gantt chart;
- describe the purpose and use of milestones when running a project; and
- apply your knowledge of project initiation processes to both fictional and real-life cases and scenarios.

4.2 KEY TERMS AND DEFINITIONS

The following key terms and definitions are applicable to this unit:

- *Critical path method (CPM)*: The shortest time in which a project can be completed, while still achieving all of the necessary specifications and deliverables.
- *Float*: The free time between parallel tasks, which determines how early or late a task can begin without affecting the critical path.
- *Gantt chart*: A planning tool that illustrates the project tasks along a timeline, indicating their logical task dependency and use of resources.
- *Milestone*: An important event or point in the project that can be used to track the project's progress.
- *Parallel scheduling*: Tasks that are performed at the same time as one another, with a potential 'float' of time existing between them.
- *Precedence diagramming method (PDM)*: This is the broad category – which encompasses methods such as the CPM – that focuses on establishing task dependence across the project schedule.
- *Predecessor*: A task that must be completed before the current task can begin.
- *Sequential scheduling*: Tasks that are performed one after another in a continuous flow.
- *Successor*: A task that must be performed after the current task has been completed.
- *Task dependency*: This refers to the relationship that tasks have to one another – particularly, those that must be completed before new tasks can begin.
- *Three-point estimation*: This involves using a combination of the most likely, optimistic and pessimistic estimates of a task in order to determine the expected duration.
- *Triple constraint*: The quality of a project is limited by the cost of the project, the resources it uses and the time that it takes to complete the project.

4.3 THE PROJECT SCHEDULE

The project schedule is the document that contains all of the information regarding the timing of project activities and the relationship between tasks. It also provides various illustrations of the project work in a calendar format. This is to show the project team and any relevant stakeholders how the project is going to progress. In order to create the project schedule, we need to have described the project work in sufficient detail. This is typically done through the process of creating the WBS, which was covered in Unit 3.

Once we have a sufficient level of detail, we can begin to sequence our tasks into a diagram, which will help us to see how the project tasks fit together. This is typically done by using one of the precedence diagram methods (PDM) (Malik, 2020). The CPM is a form of PDM that focuses specifically on the tasks that need to be completed on time in order for the project to achieve its baseline. We will also think about the significant milestones that we may want to use in order to measure the project's progress. These milestones will be indicated in both the documentation and the diagrams, such as the Gantt chart.

4.4 CRITICAL PATH

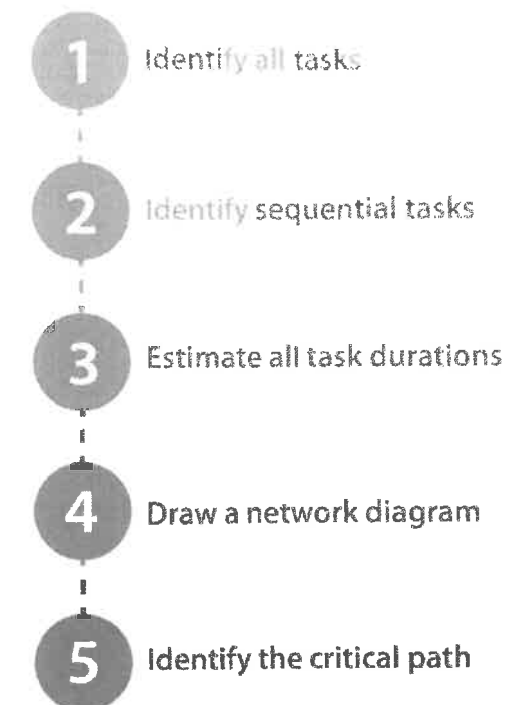
The critical path of a project refers to the shortest duration that the project can take from start to finish in order to complete all of the tasks within the schedule. It is important to understand that when we use the term 'critical' here, it refers only to the relationship that a task has to the total schedule of the project. In this way, critical tasks are not simply the tasks that are required in order to complete the project – all of the tasks should fit this description if we have planned appropriately.

In the schedule, a critical task is one that would alter the total time that it takes to complete the project. This means that any tasks we label as non-critical are labelled in this way because they are performed in parallel with (at the same time as) other, longer tasks. Non-critical tasks do not affect the total project schedule if we speed them up or slow them down within the available time between tasks. However, it is possible for a non-critical task to gain critical status if we have to adjust the duration of the task for another reason; for example, finding out that a task will require more work.

In order to determine the shortest duration of any project, we can use the CPM. This method enables a project manager to calculate how long a project will take, identify where there is a float (extra time) between tasks, and determine how the schedule can be adjusted without delaying the project. Most importantly, the CPM is used to identify the key project activities that cannot be delayed – if these activities are held up, the finish date of the project will change. The CPM offers the following advantages:

- **Efficiency:** When using the CPM, individual tasks are identified during the planning process. This helps to understand the relationships between the tasks and how each task contributes to the project.
- **Less uncertainty:** A good project plan enables project managers to predict and plan for issues that may occur during a project's life cycle.
- **Evaluation:** The project is evaluated against predetermined tasks and a schedule, which allows for greater control.

Let's work through an example that explains the different steps. The following figure indicates the steps that need to be followed in order to draft the critical path.



(Source: EDGE Learning Media (Pty) Ltd, 2020)

Figure 4.1: The five steps of the CPM

4.4.1 Step 1: Identify all the tasks

The goal of the first step in the critical path method is to determine the order of the tasks in a project. In order to do this, we must identify each task included in the project. The WBS is vital to identifying the different activities. Typically, we will be able to extract the tasks from the lowest level of the WBS – i.e. the level that describes the work packages that are required in order to achieve each main task. However, in order to be effective, the WBS must be accurate and complete. The following table shows all of the activities that need to be present in our example project.

Activity	Description	Predecessor	Duration (in weeks)
A	Market research	-	2
B	Prepare proposal	A	1
C	Obtain approval	B	1
D	Develop goals	C	2

E	Train employees	C	5
F	Track improvement	D, E	5
G	Report	F	1

(Source: EDGE Learning Media (Pty) Ltd, 2020)

Table 4.1: Example of a CPM table

4.4.2 Step 2: Identify sequential tasks

Once we have identified all of the activities, we need to determine the order in which they are to be completed. A good way in which to think about this is in terms of a recipe. The instructions in a recipe describe a series of steps that must be taken in order to deliver the result. In the case of a project, we need to identify which activities depend on other activities being completed first. This allows us to appropriately order the activities. For each task or activity, we need to ask the following three questions:

1. Which tasks need to be completed before this task can begin?
2. Which tasks should be completed at the same time as this task?
3. Which tasks can start only once this task is complete?

4.4.3 Step 3: Estimate the length of tasks

Not all activities will take the same amount of time to complete. Therefore, in this step, we need to establish how much time each activity requires. There are different ways in which to estimate the length of an activity. However, regardless of the method used, it is imperative that these time estimates are as accurate as possible. In the next step, we will use these estimates to work out the critical path for the project.

As mentioned, there are various methods that can be used to estimate the length of an activity. Many companies use the three-point estimation method. Here, three values are identified for each activity in order to calculate a range for the possible duration of the activity. The three values (or points) are as follows:

1. *The most likely (ML) length:* This value is based on resources needed, as well as realistic expectations, dependencies and interruptions.
2. *An optimistic (O) length:* This is the best-case scenario for the activity, where there are no problems or delays, leading us to a shorter activity length.
3. *A pessimistic (P) length:* This is the worst-case scenario for the activity. Here, we try to anticipate everything that could go wrong, and then calculate how these problems will affect the length of time that it takes to complete the activity.

Using the values that we assign to the points mentioned, we can calculate the duration for the activity by means of the following formula:

$$\text{Duration} = (O + (4ML) + P) \div 6$$

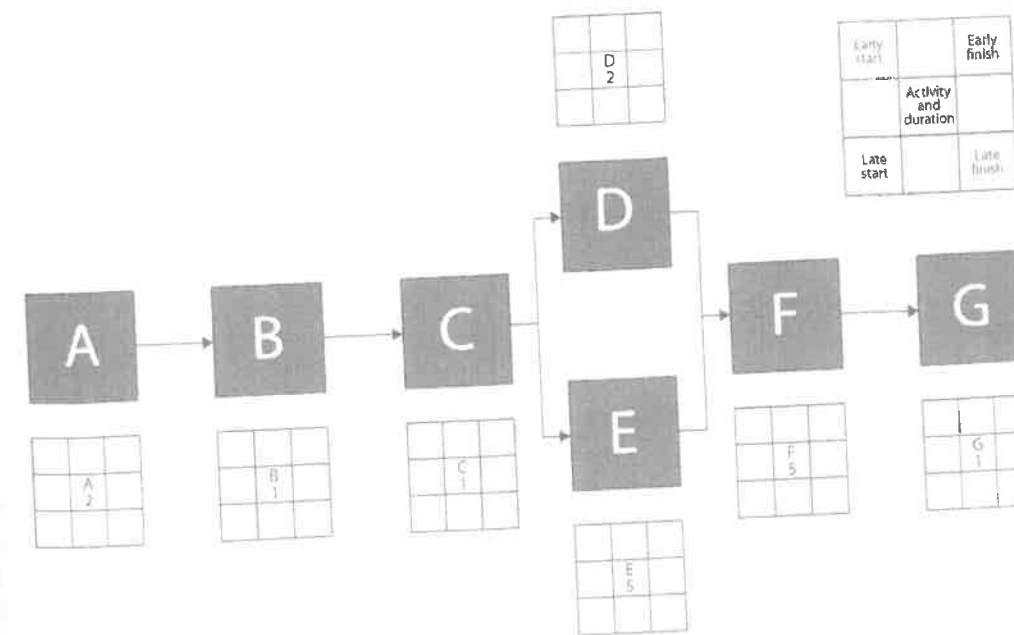
The cost estimate is calculated using a weighted average. In this case, the weighting gives more importance to the ML length. Therefore, we multiply this scenario by four. However, because we now effectively have six different values (four ML values, one O value and one P value), we need to divide the total $(O + ML + ML + ML + ML + P)$ by six.

4.4.4 Step 4: Draw a network diagram

Once we have identified the sequence of activities and the duration that each task requires, we can draw a network diagram. A network diagram displays the flow of the tasks, as well as the relationships between them. The following guidelines can be used when constructing a network diagram:

- Networks typically flow from left to right
- An activity cannot begin until all of its preceding activities are complete
- Arrows indicate precedence (importance) and flow, and can cross over other arrows
- Each activity is identified using a unique number

The following network diagram shows the activities in our example, as well as the order in which they must be completed. (Note that the empty spaces will be filled in as the unit progresses.)



(Source: EDGE Learning Media (Pty) Ltd, 2020)

Figure 4.2: A network diagram template

4.4.5 Step 5: Identify the critical path

The critical path is the shortest duration in which the project can be completed. Another way to think about this is that it is the longest path in the network diagram. If an activity on this path is delayed, the entire project will be delayed. To calculate the critical path, we first need to work out the following values for each activity:

- Earliest start (ES) time
- Earliest finish (EF) time
- Latest start (LS) time
- Latest finish (LF) time

There are two ways in which we can calculate these start and finish times in the critical path, namely the *day one* and *day zero* calculations. When using the day one method, the first day of the project is referred to as day one. With this method, we need to add or subtract one in our calculations, as we will see shortly. When using the day zero method, the first day of the project is referred to as day zero. In this case, we do not adjust anything when calculating the dates.

The ES is the earliest that an activity can start once a preceding activity on which it depends has finished. If one of the previous activities in the path runs late, this activity will be affected. We can therefore work out the ES of an activity as follows:

$ES = EF \text{ of preceding activity} + 1$ (day one method)

$ES = EF \text{ of preceding activity}$ (day zero method)

If an activity has more than one predecessor, you must use the activity with the largest EF, as this is the predecessor that will take longest to finish.

The EF is the earliest time in which an activity can finish. This is the date on which an activity will finish if all preceding activities finish on time.

$EF = \text{Activity duration} + ES - 1$ (day one method)

$EF = \text{Activity duration} + ES$ (day zero method)

Before we go any further, we need to understand two further concepts, namely the *forward pass method* (also known as the first pass) and the *backward pass method* (also known as the second pass). These methods form part of a two-pass calculation. When using the forward pass method, we add the ES and EF times to each activity in the network diagram, and then use these to calculate the end date of the project. When using the backward pass method, however, we add the LS and LF times to each activity in the network diagram. This method is used in order to calculate the float or slack for each activity in the project. Remember, the float for the critical path is zero.

Calculating ES and EF of activities using the forward pass method

Activity A:

$ES = 0$ (as it is the first activity in the project)

$EF = ES \text{ of A} + \text{Duration of activity}$

$EF = 0 + 2$

$EF = 2 \text{ weeks}$

Activity B:

$ES = EF \text{ of previous activity}$

$ES = 2 \text{ weeks}$

$EF = ES \text{ of B} + \text{Duration of activity}$

$EF = 2 + 1$

$EF = 3 \text{ weeks}$

Activity C:

$ES = EF \text{ of previous activity}$

$ES = 3 \text{ weeks}$

$EF = ES \text{ of C} + \text{Duration of activity}$

$EF = 3 + 1$

$EF = 4 \text{ weeks}$

Activity D:

$ES = EF \text{ of previous activity}$

$ES = 4 \text{ weeks}$

$EF = ES \text{ of D} + \text{Duration of activity}$

$EF = 4 + 2$

$EF = 6 \text{ weeks}$

Activity E:

$ES = EF \text{ of previous activity}$

$ES = 4 \text{ weeks}$

$EF = ES \text{ of E} + \text{Duration of activity}$

$EF = 4 + 5$

$EF = 9 \text{ weeks}$

Activity F:

ES = EF of previous activity
ES = 9 weeks

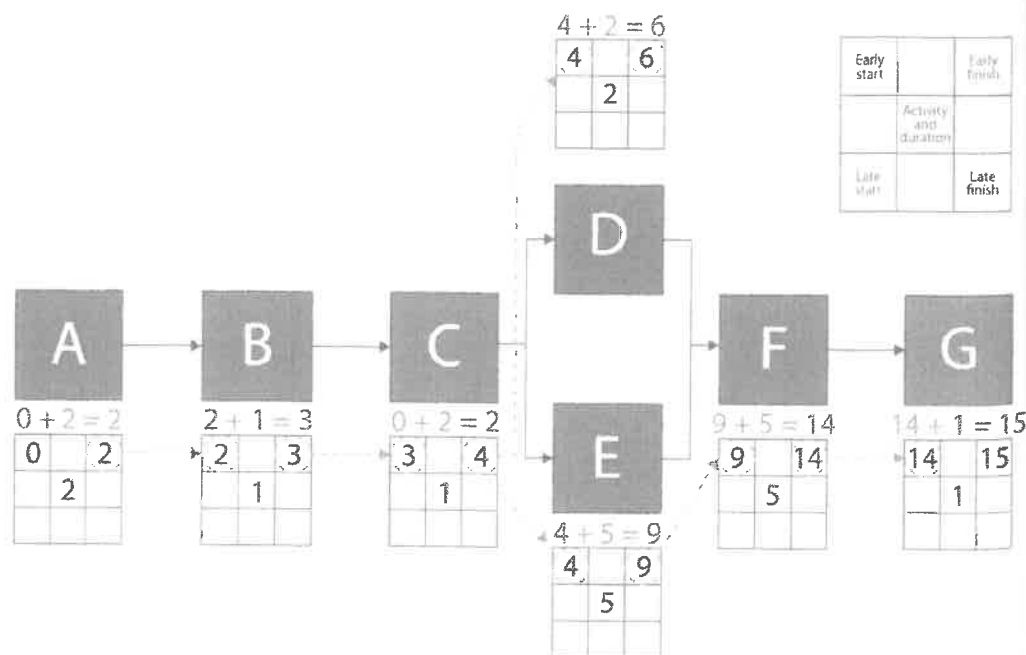
EF = ES of F + Duration of activity
EF = 9 + 5
EF = 14 weeks

Activity G:

ES = EF of previous activity
ES = 14 weeks

EF = ES of G + Duration of activity
EF = 14 + 1
EF = 15 weeks

The following figure provides an example of how these calculations would fit into the critical path diagram, as well as what the diagram should look like at this point.



(Source: EDGE Learning Media (Pty) Ltd, 2020)

Figure 4.3: Critical path diagram with forward pass calculation

Note that, on the diagram, from task B onward, the ES date is inherited from the EF date of its predecessor. For example, task C has an ES date of day 3, as this is the EF date on which task B will be complete.

Calculating the LS and LF of activities using the backward pass method

The LF is the latest date on which an activity can finish without delaying the project. The LF is calculated as follows:

LF = LS of the successor activity – 1 (day one method)
LF = LS of the successor activity (day zero method)

The LS, on the other hand, is the latest date on which an activity can start without delaying the project. This is equal to the LF minus the time required in order to complete the activity:

LS = LF of activity – Activity duration + 1 (day one method)
LS = LF of activity – Activity duration (day zero method)

Now, let's calculate the LS and LF values for the same set of activities.

Activity G:

Earlier, we established that the project would take 15 weeks to complete. Therefore, the LF of this activity will be 15, as it cannot go over the project completion date.

LS = LF of activity – Activity duration
LS = 15 – 1
LS = 14 weeks

Activity F:

LF = LS of successor activity
LF = 14 weeks

LS = LF of activity – Activity duration
LS = 14 – 5
LS = 9 weeks

Activity D:

Activity D has two successor activities. Therefore, we use the activity with the lower LS date. In this case, it does not matter, as they both have the same date.

LF = LS of successor activity
LF = 9 weeks

LS = LF of activity – Activity duration
 LS = 9 – 2
 LS = 7 weeks

Activity E:

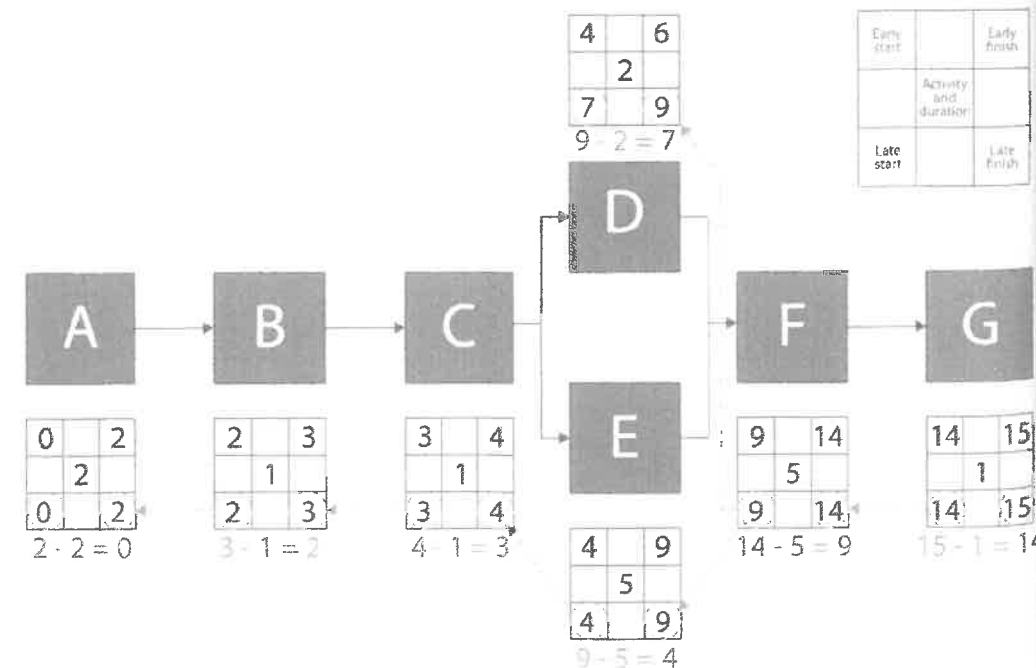
LF = LS of successor activity
 LF = 9 weeks

LS = LF of activity – Activity duration
 LS = 9 – 5
 LS = 4 weeks

Activity A, B, C:

On the critical path, the ES and EF dates are the same as the LS and LF dates.

We can now complete the network diagram, which will look as follows:



(Source: EDGE Learning Media (Pty) Ltd, 2020)

Figure 4.4: Critical path diagram with backward pass calculation

The last calculation we can perform using the CPM is the float. The float is the amount of time for which the activity can be delayed without delaying the ES date of subsequent tasks. The float is calculated as follows:

$$\text{Float} = \text{LF} - \text{ES} - \text{Duration}$$

Other formulae that can be used to calculate the float include the following:

$$\text{Float} = \text{LF} - \text{EF}$$

or

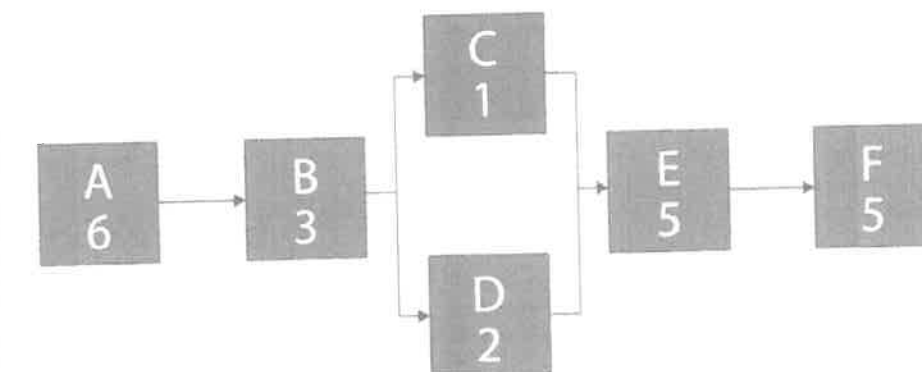
$$\text{Float} = \text{LS} - \text{ES}$$

A float of zero means that there is no room for delay. In other words, if the activity is delayed, it will postpone the finish date of the overall project. Therefore, a float of zero means that the activity is a critical activity. In this way, the set of activities that have a zero float shows the critical path of the project.

In the previous figure, we can see that activity D has a float of three (i.e. three days), due to the fact that it has an EF of six and an LF of nine (as well as an ES of four and an LS of seven). This is because both activity D and the parallel task, activity E, must be completed before activity F can begin. However, activity E will take three days longer to complete than activity D, thereby leaving a float time available for activity D.

EXERCISE 4A

Consider the following diagram, and then answer the questions that follow.



(Source: EDGE Learning Media (Pty) Ltd, 2020)

Figure 4.5: Calculating the project schedule for Exercise 4a

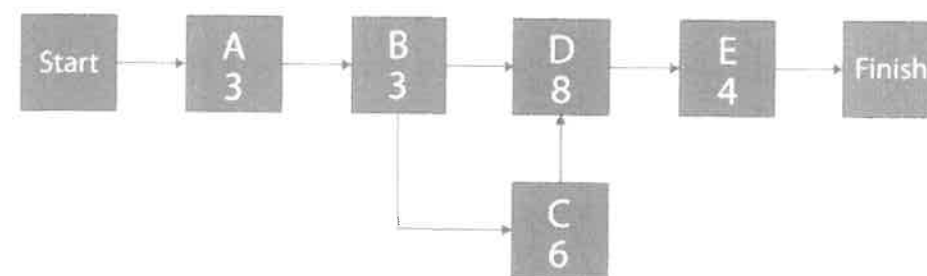
Note: Use the day zero method when calculating the project schedule.

Required:

- (i) Perform the forward pass calculation in order to determine the ES and EF of the project.
- (ii) Perform the backward pass calculation in order to determine the LS and LF of the project.
- (iii) Work out the critical path of the project, and then indicate this by providing an alphabetic sequence (e.g. ABC).

? EXERCISE 4B

Consider the following diagram, and then answer the questions that follow.



(Source: EDGE Learning Media (Pty) Ltd, 2020)

Figure 4.6: Calculating the project schedule for Exercise 4B

Note: Use the day one method when calculating the project schedule.

Required:

Perform the forward pass calculation in order to determine the ES and EF of the project.

4.5 PROJECT MILESTONES

The completed project is the final goal. However, we also need to meet intermediate goals during the project in order to ensure that it is progressing smoothly. These intermediate goals, which are referred to as project milestones, provide 'road signs' during the project, which we can use in order to manage the project.

For example, suppose you decide to begin studying for an exam a month before the exam date. What are the milestones you need to meet in order to ensure that you cover all of the necessary work before the exam? Perhaps, you will decide to summarise all of the work in week one. Then, you will study the first three chapters by week two, the last three chapters by week three, and in week four, you will review everything. These study milestones will help to ensure that you are prepared for the exam. If you miss one of the milestones, your preparation will not be as effective. The following are examples of project milestones:

- Events
- Important decisions that need to be made
- Checkpoints
- A percentage of the project that needs to be completed

In this section, we will identify the key elements of a project, which become the project's milestones. Milestones should be significant elements of a project that reflect the project's status at a specific point in time. In this way, they are also used to measure the progress of a project. When a project reaches a particular milestone, we need to answer the following questions:

- Why is this milestone here?
- What does this milestone indicate about the project?
- What is the impact of this milestone?
- What does the status of the milestone reflect about the progress of the project?

4.6 CREATING GANTT CHARTS

A Gantt chart is a diagram that shows the start and finish dates of a project and the relationship between project activities. In this way, it is a useful tool for tracking tasks against project schedules. However, before the chart can be drawn, there are a number of preparatory steps that need to be completed.

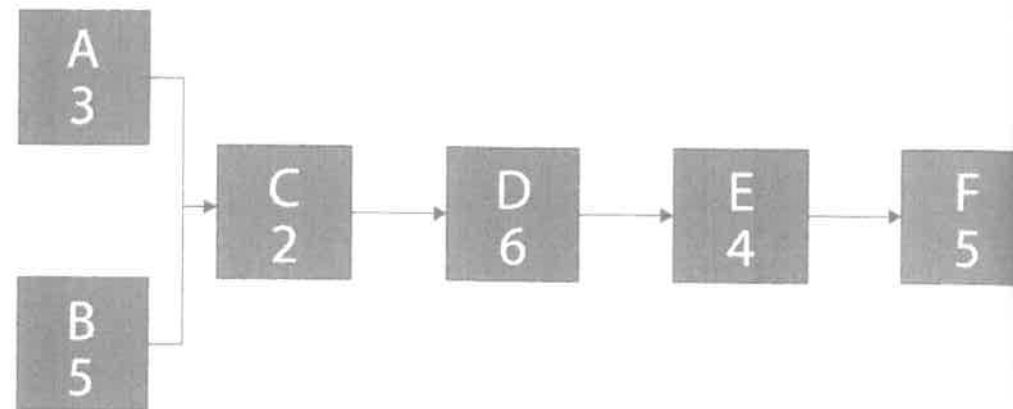
When it comes to drafting Gantt charts, there is specific terminology that you need to be familiar with in order to schedule the tasks and indicate the relationship that one task has to another. The following are the typical relationships that tasks in the schedule can have to one another (Malik, 2020):

- *Start to finish (SF)*: The current task will begin as the previous task is finished.
- *Finish to finish (FF)*: The current task will finish at the same time as the following task.
- *Start to start (SS)*: The current task will begin at the same time as the following task.
- *Finish to start (FS)*: The current task will finish as the following task begins.

These relationships are shown on the Gantt chart by drawing a line from one task to another, thereby indicating when the task is due to start and finish in relation to its predecessor or successor. With this in mind, let's take a look at the steps that must be followed when creating a Gantt chart.

4.6.1 Step 1: Determine the task predecessors and critical path

The first step is to develop a CPM table. This is then used to determine the order of tasks. We have seen one example of this already; however, let's consider a new example for the purpose of drawing a Gantt chart. Consider the following CPM diagram and associated table.



(Source: EDGE Learning Media (Pty) Ltd, 2020)

Figure 4.7: An example of a CPM diagram

Activity	Description	Predecessor(s)	Duration (in weeks)
A	Design bird lookout point	-	3
B	Create first lookout	-	5
C	Test lookout integrity	A, B	2
D	Lay foundations of more lookouts	C	6
E	Build structure of more lookouts	D	4
F	Outfit all lookouts with camouflage	E	5

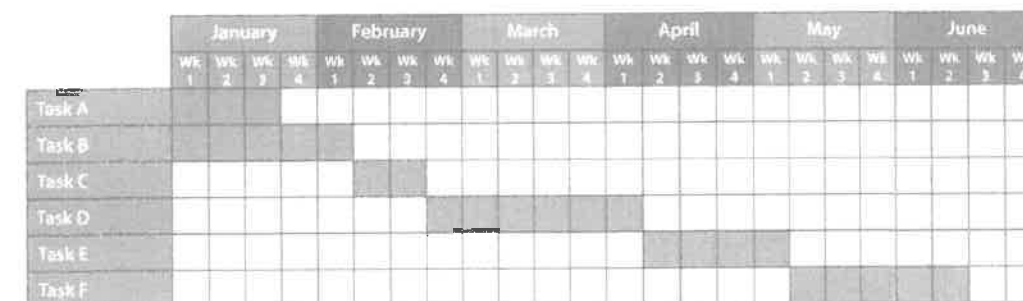
(Source: EDGE Learning Media (Pty) Ltd, 2020)

Table 4.2: A CPM table for a Gantt chart

The descriptions of the tasks are not important for the calculation of schedule in this case, as they do not influence the duration of the task. Rather, they simply provide context that can help to remind us of the nature of the work required for a task. Of particular importance here are the task predecessors and the activity duration, as they will tell us the order in which the tasks need to appear on the diagram we are going to draw. When a task has a predecessor, it can begin only once the predecessor task has been completed. For example, if you are building a house, you must first lay the foundation before you can build the walls. Here, the foundation is the predecessor for the walls, as they cannot be built earlier than the foundation.

4.6.2 Step 2: Draw tasks on the Gantt chart timeline

We can now draw the tasks on the timeline, relying on the information we have calculated in the CPM table and diagram. The Gantt chart is essentially a depiction of the tasks along a calendar or timeline. In order to complete the chart, we need to decide on the unit of time that is appropriate to represent the work. In this case, we are dealing in work weeks rather than workdays, so it is appropriate to compress the timeline according to the weeks in a month (typically four). This allows us to view the entire project on a single page – whereas if we expanded the work weeks into 30 days each, our chart would be extremely large.



(Source: EDGE Learning Media (Pty) Ltd, 2020)

Figure 4.8: An example of a Gantt chart that depicts work weeks

Each task must be entered on a new row, so that the tasks are easily distinguished from one another. If you have broken down your project into particular stages or phases, it can be useful to colour code the activities on the Gantt chart according to each stage. For our purposes, we will keep things simple and consider each task as part of a single workflow, from start to finish.

If you are using software such as Microsoft Excel or Microsoft Project to create the Gantt chart, you will need to enter the information in table format and use the available chart functions. The following link is a video that explains the method to follow if you are using software in order to create a Gantt chart in Microsoft Project:

<https://www.youtube.com/watch?v=J9uctgUaEic>

If you are creating a Gantt chart in Microsoft Excel, you can access the following link to watch a relevant tutorial:

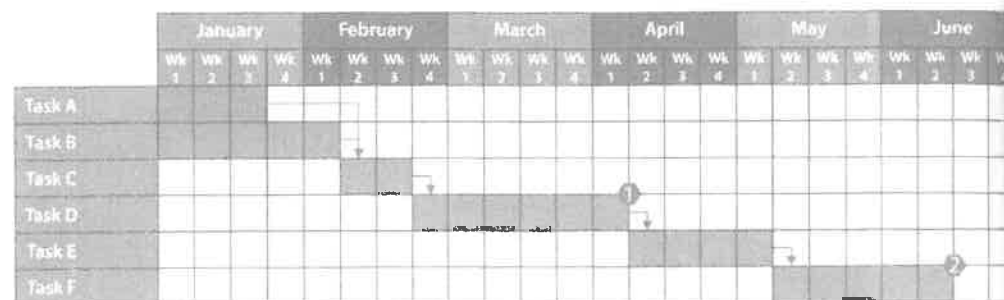
<https://www.youtube.com/watch?v=un8j6QqpYa0>

4.6.3 Step 3: Indicate task dependencies and milestones

The task predecessors that we have used in order to draw the critical path diagram will now be added to the diagram to show how the tasks relate to one another. This example is based on the

SF method, meaning that each task will start only once its predecessors are complete. The red lines and arrows indicate the flow of the tasks from one to the next.

Regarding milestones, let's assume that at the completion of task D is when we have reached a point in the project where the customer would like a report to be developed that summarises the work completed to date. The next milestone would be the completion of the project, as this is when it can be handed over to the customer.



(Source: EDGE Learning Media (Pty) Ltd, 2020)

Figure 4.9: Gantt chart with critical path and milestones

4.6.4 Step 4: Create a resource register

A resource register is a simple table that lists all of the project resources that will be required, how much they will cost according to their use, and their availability for the project. Consider the following project register.

Resource	Type	Quantity	Cost	Availability
Designer	Labour	1	R 300/hr	30 hrs/week
Fabricator	Labour	2	R 200/hr	40 hrs/week
Engineer	Labour	1	R 350	15 hrs/week
Concrete	Material	500 kg	R 15/kg	200 kg/week
Wood	Material	200 m	R 75/m	600 m/month
Surveyor	Equipment	1	R 100/hr	10 hrs/week

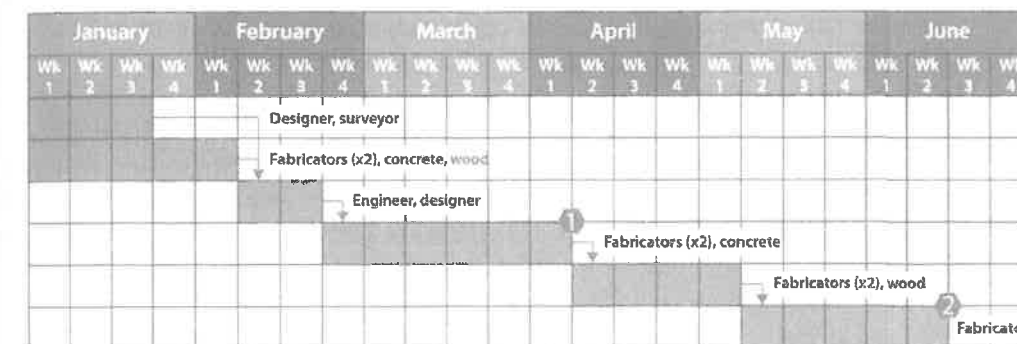
(Source: EDGE Learning Media (Pty) Ltd, 2020)

Table 4.3: Example of a resource register

Using software will make the process of assigning resources to your tasks a lot easier, as they can be automatically linked to a particular task. Software can also be used to track the project's expenditure, as you are able to indicate the quantity, cost and use of each resource as it is added to the chart.

4.6.5 Step 5: Add resources to the chart

This step requires you to indicate which resources will be needed for each task, by adding them to the Gantt chart. This is done in order to add an extra level of efficiency and control for the project manager, as they will not need to refer to various documents to know who or what is required on particular days; rather, they will be able to find it all in one place.



(Source: EDGE Learning Media (Pty) Ltd, 2020)

Figure 4.10: Gantt chart with all elements present

4.7 PROJECT BASELINE

The project baseline is simply the completed plan that the project will follow. It is made up of all the planning documentation that you have learned about up until this point. The baseline is created as a standard that we can use to compare the *actual* progress in a project to the *planned* progress of a project. The following elements of the triple constraint inform the baseline of a project (RationalPlan, n.d.):

- **Scope:** The specifications that are required to complete the work, described by the WBS or the user stories that are generated by communicating with the customer.
- **Budget:** The distribution of funds across the project tasks, thereby setting a planned cost for each task. This can be compared to the actual expenditure upon completion of the task.
- **Schedule:** The time frame of the project, broken down by task. This describes any task dependency that exists and establishes the total project duration.
- **Quality:** The possible opportunities or risks that may play a part in the achievement of project work, and to what degree they may impact the project.

Projects are not static. In other words, unforeseen events may occur during the project. When this happens, estimates, milestones and baselines may need to be adjusted. For this reason, a project should include a documented and official change control process. This process is intended to identify, monitor and manage any changes that may occur to the baseline throughout the duration of the project.

What happens when we have determined that the actual performance of the project has deviated from the project baseline? We may approach the customer to ask for more time, resources or money in order to adjust the baseline. Any changes that we make to the baseline will require significant replanning and restructuring of the baseline. In this way, documentation will need to be created from scratch. If the project is behind schedule, one method that can be used to realign the project with the baseline is to compress the project schedule. Speeding up the project schedule by compressing it can be done in a number of ways, namely schedule crashing, resource levelling or task rescheduling. We will now look at each of these methods in more detail.

Schedule crashing

To 'crash' a project involves adding extra resources in order to shorten the duration of the tasks in the schedule. For example, imagine that we have two workers who can build a platform in four days. If we add another two workers, we could assume that the platform can be built in half the time (i.e. two days).

Resource levelling

If the project is suffering from delays that result from a lack of resources, the project manager should 'level' the resources so that they are being used at 100 per cent capacity as often as possible. Resources that are operating at more than 100 per cent capacity are over-allocated, and this needs to be recognised as a factor that is delaying the project work. For example, imagine that we have an engineer who can work for a total of ten hours a day. If this engineer needs to split their time between two projects equally, we cannot assign the whole ten hours of work time to our project. Rather, we could assign only five hours (50 per cent) of the resource to our project. The total resource availability of the engineer is therefore 100 per cent; however, the resource availability for our particular project is only half of this amount.

Task rescheduling

The project schedule may have tasks that can be performed at the same time if they are broken up into smaller tasks that do not share resources. This can allow us to take a rather strict, linear structure and run smaller tasks in parallel in order to save time.

As with most methods in scheduling, there are advantages and disadvantages to each approach of compressing the project schedule. The following table outlines one major advantage and disadvantage of each of the three methods that we have just discussed.

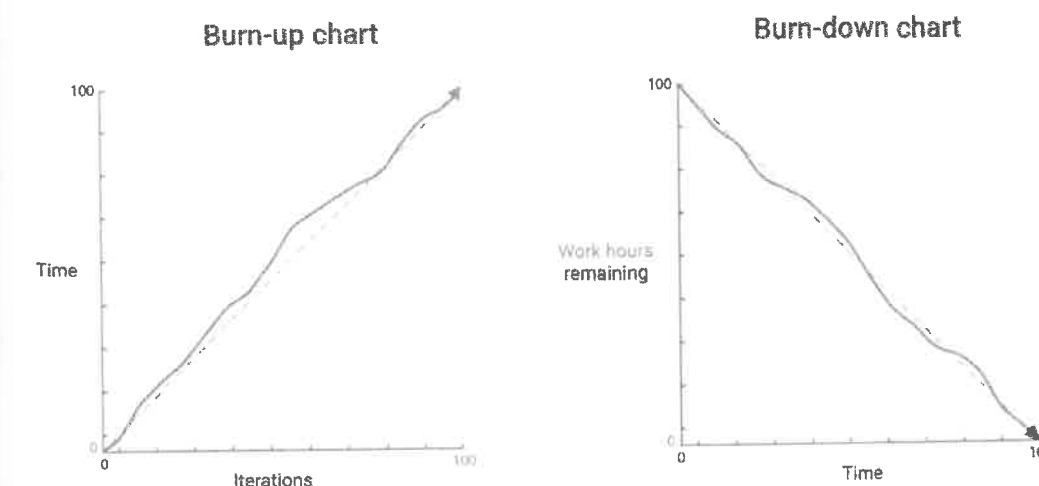
Method	Advantage	Disadvantage
Schedule crashing	It provides the most significant reduction in the total project duration, and it can be performed to varying degrees – i.e. the project does not need to go into full crash mode in every case.	It can be very costly to add more resources to a task, and this will require changes to be made to the budget baseline of the project.

Resource levelling	It is cost-effective and does not require changes to be made to the project baseline. It also makes use of resources more efficiently.	It decreases the flexibility of resources, as they are utilised as strictly as possible within the schedule.
Task rescheduling	It makes use of existing resources, and it can reduce the total project duration significantly.	It increases the likelihood of errors or discrepancies between tasks, and it requires the baseline to be changed.

(Source: EDGE Learning Media (Pty) Ltd, 2020)

Table 4.4: Schedule compression advantages and disadvantages

Agile project management uses what we call 'burn charts', which can be created upward or downward, to measure how the actual project performance compares to the required performance. The charts show us how much of the work we have completed at each point in the schedule, as well as the project baseline. The following figure provides an example of each chart. Note that the dashed line on each chart is used to indicate the baseline, or the ideal performance.



(Source: EDGE Learning Media (Pty) Ltd, 2020)

Figure 4.11: Example of a burn-up and burn-down chart used in agile project management

In the burn-up chart, the project is measured according to iterations (work packages) completed over time (project schedule). With a burn-up chart, we start with a zero balance on both the time and the iterations that have been achieved. In other words, we have not done any work and no time has passed. As the project gets under way, we will record how much work has been completed in each iteration along the x-axis, and how much time has passed in the project schedule on the y-axis. At the end of the project, we will be able to see how much work was completed in each iteration, as well as how long these iterations took in order to complete. This chart follows a positive trend until the project's completion.

In the burn-down chart, we begin with the full balance of work to be completed, as well as a zero balance on our schedule. In other words, we have 100 per cent of the work left to do and no time has passed in the project schedule. As the project time progresses along the x-axis, we mark off the work we have removed from the total time along the y-axis. In this way, we can see how much work is left to do in the project, as well as how much time we have left in which to do this work. This chart follows a negative trend until the project's completion. The parameters of 0 to 100 in the previous figure are simply an example of a project that has 100 iterations; however, every project will have a unique number of iterations that reflect the work that needs to be completed.

Establishing the project's baselines is the formal end of the planning stage of a project. The next stage is the execution of the project. Remember that the baselines are a guide and a management tool, and that the project will need to be monitored carefully in order to ensure that it stays within this guide.



EXERCISE 4C

- (i) Discuss the purpose of creating a project baseline.
- (ii) Indicate whether the following statements are true or false. (If false, substantiate your answer.)
- Rescheduling tasks in a project makes use of the existing resources that a project possesses.
 - Schedule crashing is when a project team fails to achieve the planned schedule.
 - Resource levelling increases the flexibility of resources, allowing them to be used more freely.
- (iii) Match the following terms in Column A with their correct definitions in Column B.

Column A		Column B	
a	Scope	1	The original plan that is developed for a project, against which actual performance is measured.
b	Budget	2	The level of accuracy or acceptability of the project work according to the triple constraint.
c	Schedule	3	The total amount of work that a project aims to achieve.
d	Quality	4	The allocation of project funds to each project task.
e	Baseline	5	The particular order and timing of the tasks that need to be completed within a project.

4.8 PROJECT MANAGEMENT IN PRACTICE

Let's consider an example of how each of these documents would be created in practice.

Widaad is the project manager for Drone2Me, a start-up company that delivers online shopping to customers with the use of expertly engineered delivery drones. The current project that Drone2Me is working on aims to create a larger drone model that can handle heavier weights, thereby making it suitable for large items or multiple deliveries.

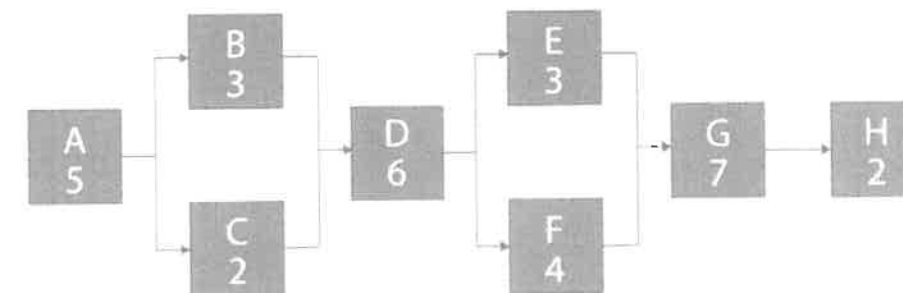
WBS	Task	Description	Predecessor	Duration (in days)
1.1	A	Redesign mechanical structure		5
1.1.1	B	Improve self-balancing mechanism	A	3
1.1.2	C	Improve navigation software	A	2
1.2	D	Create prototype parts	B, C	6
1.2.1	E	Create partial prototype	D	3
1.2.2	F	Test individual parts	D	4
1.3	G	Controlled flight testing	E, F	7
1.4	H	Live flight testing	G	2

(Source: EDGE Learning Media (Pty) Ltd, 2020)

Table 4.5: Critical path table for Drone2Me

Using the information from this table, Widaad creates a critical path diagram in order to indicate the workflow of the project. She notes that there are two points in the project at which tasks will be performed in parallel, namely the improvement of the self-balancing system and the navigation system, and the creation of a partial prototype and the testing of individual parts.

The completion of these parallel tasks is essential to the success of the project. Widaad therefore chooses them as the two primary milestones of the project, along with the final task, which will ultimately determine whether the drone can be placed into active service. Consider the following critical path diagram that Widaad has developed.



(Source: EDGE Learning Media (Pty) Ltd, 2020)

Figure 4.12: Critical path diagram for Drone2Me

With the critical path diagram complete, Widaad is able to schedule the tasks in the form of a Gantt chart. However, she thinks that it would be useful to create her resource register first, so that the baseline can easily be established alongside the drawing of the Gantt chart. She therefore assigns the resources to the tasks in the resource register, to avoid overpopulating the chart with information.

Resource	Type	Cost (per day)	Assignment
Mechanical engineer	Labour	R 450	A, D, E
Electrical engineer	Labour	R 450	B, E, F
Software developer	Labour	R 500	C, E, F, G, H
Frame	Material	R 225	A, B, D, E
Electrical components	Material	R 300	B, C, D, E
Software	Material	R 750	C, E, G, H

(Source: EDGE Learning Media (Pty) Ltd, 2020)

Table 4.6 Resource register for Drone2Me

With this information at hand, you are brought on to the project as an extra resource in order to help create some planning documentation for the team.

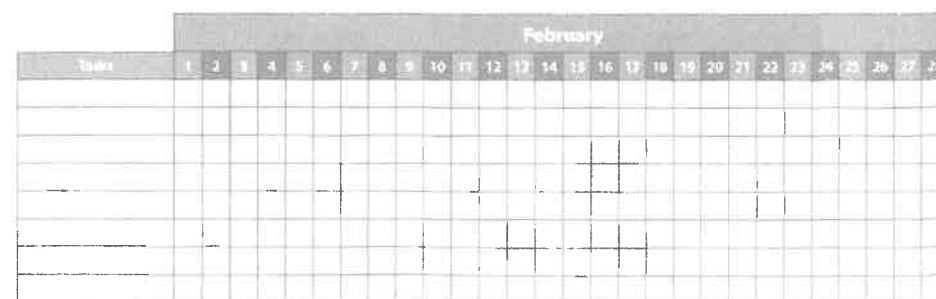


EXERCISE 4D

Read the case study provided, and then answer the questions that follow.

Required:

- Perform a two-pass calculation on the CPM diagram and indicate the critical path using an alphabetical sequence (i.e. ABC...). You do not need to show your working.
- Using the information provided, as well as the following template, fill in the Gantt chart for the project. Use the SS method in order to schedule parallel tasks.



(Source: EDGE Learning Media (Pty) Ltd, 2020)

Figure 4.13: Gantt chart template for Drone2Me

- Using the cost per day of each item in the resource register, calculate the budget baseline for resources on this project.

4.9 SUMMARY

Project scheduling can be a complicated process, often requiring us to calculate and estimate values that are not easy to understand at first glance. However, it is an essential skill that you will need to refine in order to effectively manage a project in any industry. All projects are made up of tasks and timelines, which is an aspect of project management that can lead to the success or failure of a project. Effective scheduling can solve many of the typical problems that project managers face when managing their team, the workload, or simply the date of delivery. Be sure to revise this section in detail in order to ensure that you can quickly and effectively calculate the schedule of a project when required.

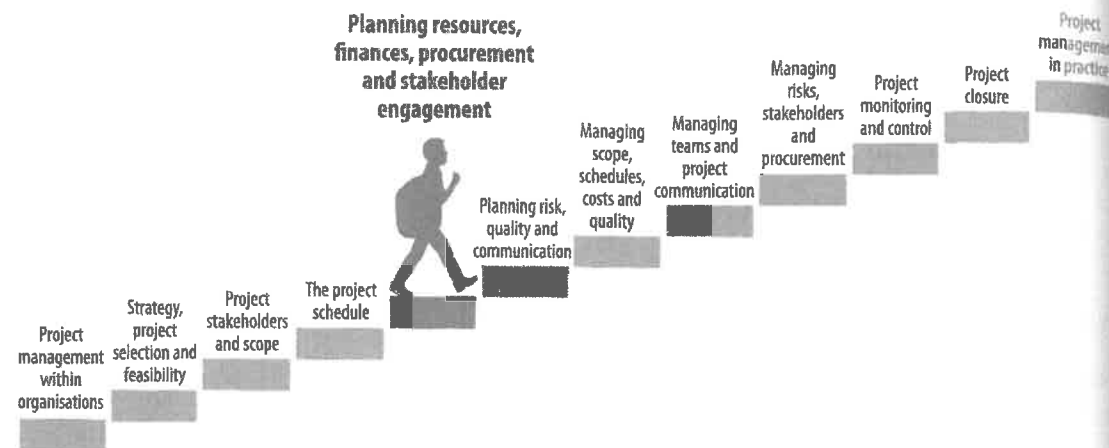
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5.1 INTRODUCTION

Projects can be overwhelming, especially if you are just starting out. By now you have learned who your stakeholders are, how to develop a proper scope and how to set the project schedule and break it down into smaller, more manageable tasks. For example, if you own a bakery or a deli and regularly bake cakes, by now you would know *who* you are baking for, *when* it needs to be baked by and *how* you are going to bake it. All that is missing is the ingredients. You need to know *which* ingredients you will need, *when* you are going to need them, *who* you are going to buy them from and how much they will cost.

Resource, budget, procurement and stakeholder planning are all invaluable tools that you will use in order to solve those questions.

After studying this unit, you should be able to:

- discuss the components of human resource planning;
- create a resource management plan;
- unpack important financial planning considerations;
- produce a cost management plan;
- explain various procurement strategies and selection criteria;
- compose a procurement plan;
- discuss the intricacies of stakeholder involvement planning;
- create a stakeholder engagement plan; and
- apply your knowledge of project planning processes to both fictional and real-life cases and scenarios.

5.2 KEY TERMS AND DEFINITIONS

The following key terms and definitions are applicable to this unit:

- **Budget:** A document that breaks down the financial cost of each resource, activity and vendor of a project. The budget also contains the schedule of payments, contingency funds and other inflows and outflows of cash from the project.
- **Controlling:** Using constant feedback, project data and key performance indicators (KPIs) to determine whether and in what way certain aspects of the project are underperforming.
- **Cost:** The amount of resources, time or money that must be spent on a project or activity.
- **Estimation:** Using a methodical, research-based approach to determine the likely need or cost of a resource for an activity or project.
- **Human resource:** A team member, project manager or stakeholder whose presence and activity have a measurable, positive impact on the project's completion.
- **Key performance indicator (KPI):** A quantifiable marker by which the performance of a task, project, resource or supplier can be evaluated.
- **Organisational assets:** Assets and processes that the organisation has access to.
- **Outsourcing:** Finding vendors or suppliers outside of the organisation in order to supply resources or complete a task.
- **Procurement:** The entire process of determining which resources need to be made or bought, developing a list of sellers, advertising the bid, negotiating the contract and accepting delivery of the goods or services.
- **Stakeholder:** Any person or organisation who is personally vested in the success of a project. For example, someone who has invested money in the project, someone who will benefit from the project's completion or someone who draws a salary from the project.

5.3 HUMAN RESOURCE PLANNING

One of the most important resources available to a project manager is the people who will work for them. Each project will attract and require a variety of people with different skills and backgrounds. Because of this complex system of teams and individuals, proper human resource planning is an important step when assigning the right person to a task. Human resource planning is also responsible for the assessment of staff and the tasks they complete (*Project Management Docs*, n.d.).

Human resource planning involves being able to judge whether the available resources are sufficient for the project, or whether more resources (e.g. staff) are necessary. If the project requires more human resources, then the question arises as to whether new staff need to be hired or current staff should be retrained, or if the task(s) can be outsourced to another company. The last option, however, depends on the technological sophistication and available budget of the host company.

5.3.1 Estimating and identifying required resources

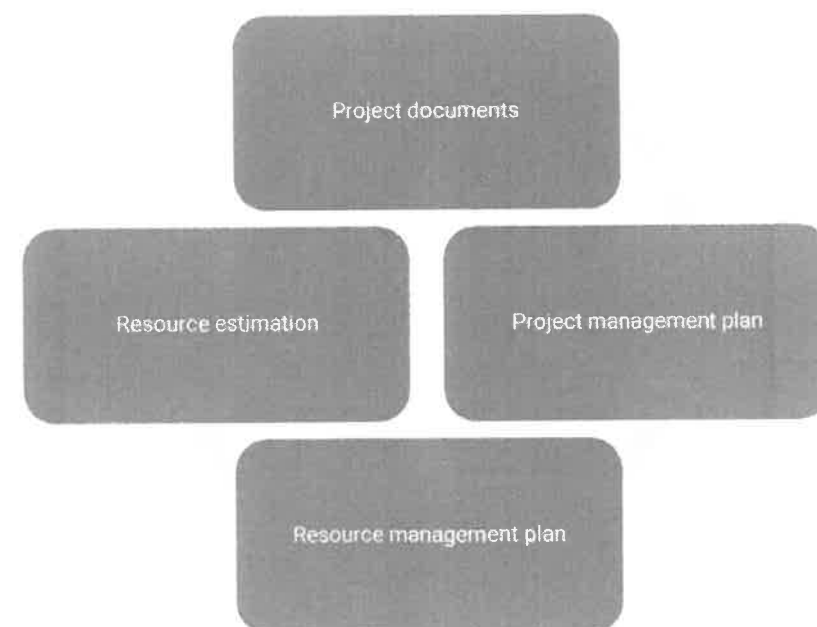
Proper resource estimation underlies the success of any project. The project team needs to know which resources will be required when and in which quantities. Incorrect estimation can lead to projects

running out of resources at crucial times, which has the knock-on effect of the project going over-budget and exceeding its schedule. Recently, a major video games company promised some of their highest-paying customers a custom bag made from a high-quality canvas material, which was to come with their latest video game. However, when it came to delivery, it turned out that they incorrectly estimated the amount of canvas they would need. This resulted in the company being unable to deliver most of the bags until a full six months after the promised date. This blunder cost the company more money than they had planned for this project and severely damaged the company's reputation, which meant that they lost prospective customers and return customers were discouraged.

When beginning a new project, regardless of what the project is, you will need to estimate the type and amount of resources necessary to complete it. Proper estimation is only possible in a project with a well-defined scope, budget and plan (Project Management Institute, 2017: 322). How else would the manager or procurement staff know which (and how many) resources are appropriate for the project?

Project inputs

Resource estimation is a cyclical process that begins and ends with the established project documents. The project documents, as well as the available organisational resources, guide resource estimation. Once the resources have been estimated, the project documents are updated to reflect this and the cycle begins again as resources are depleted and tasks are completed (Project Management Institute, 2017: 323). The following figure illustrates this repetitive process.



(Source: EDGE Learning Media (Pty) Ltd, 2020; adapted from Project Management Institute, 2017: 323)

Figure 5.1: The cyclical nature of resource estimation and project document updates

Proper estimation also requires a variety of inputs (Dwevedi, 2017):

- **Project documents:** The project documents are crucial for effective resource estimation. Documents such as activity lists, risk forecasts, budget documents and schedules all contribute to resource estimates. By using these, you can determine which resources are required for each activity, when you will need them, how much you can spend on them and the risks associated with each activity or resource.
- **Organisational assets:** Proper resource estimation relies on knowing which assets and processes the organisation has access to. Factors such as the organisation's access to intellectual property, capital and technology, as well as various policies, best practice guides and standard operational procedures, all contribute to resource estimation. These factors further affect the type of resource you can procure, as well as factors such as storage, purchasing and transport.
- **Business environment factors:** Factors in the immediate business environment can have a huge impact on resource estimation. For example, relevant factors may include the following: whether or not a particular resource is available, where it can be procured from, whether the resource fits in with organisational culture (e.g. using an environmentally destructive resource in a 'green' company), which skills are available to work with the resource and whether the market permits purchase or sale of the resource.

Once the inputs have been gathered, there are several techniques you can use to generate resource estimates. These techniques are discussed in the following table, but remember that a robust estimate often relies on a blend of these techniques, rather than just one of them.

Technique	Description
Alternatives analysis	Each activity receives multiple resource estimates – varying the type, quantity and cost of the resources. The project team will then evaluate each resource estimate on its merits and demerits until a final estimate has been developed.
Analogous estimation	By studying similar past projects, the project manager can develop a resource estimate based on what worked for another project or set of projects that sought to achieve similar goals in a similar setting.
Bottom-up estimation	The project is divided into smaller, more manageable tasks and teams. Resources are then estimated at this 'bottom' level for each task and team, and then successively aggregated until the resources for the final project are known.
Cost of quality	This analysis is closely tied to the risk plan in the project documents and estimates the chance of an activity failing, as well as the quantity of resources that would be lost as a result.
Expert judgement	Taking advantage of professionals, teams or contractors who have had previous experience completing a project similar to the one at hand, or who have had training in resource planning. These specialists often have insights and overviews that others may overlook.
Meetings	The project team organises meetings with team leaders or downstream managers to gather their insights and opinions on which resources would be needed.

Parametric estimation	The project manager incorporates data from similar projects into a mathematical formula or statistical model, in order to estimate the appropriate number and type of resources.
Project management information systems (PMISs)	PMISs often come packaged with a host of useful tools and databases that assist with resource estimation. Often, these tools can be used to automate large parts of the resource estimation process, but they will still require a human to ensure that they are correct.
Three-point estimation	The three-point estimate seeks to develop a range of quantities of each resource that may be necessary for the project. These estimates rely on 'most likely' (ML), 'optimistic' (O) and 'pessimistic' (P) resource expectations. The estimate is therefore calculated as follows: $\text{Estimate} = (O + 4 \times ML + P) \div 6$. For example, if you are in charge of estimating the amount of steel (in tonnes) necessary for 300 cars, the estimate could look like this: $(300 \text{ tonnes} + 4 \times 400 \text{ tonnes} + 1\,200) \div 6$, which would yield an estimate of around 516 tonnes of steel.
Vendor bid analysis	The project manager will also need to evaluate the available vendors on their ability to deliver consistent, quality materials at a stable price.

(Source: EDGE Learning Media (Pty) Ltd, 2020; adapted from Watt, 2014)

Table 5.1: The various estimation and evaluation techniques used during a typical project

Once the project documents have been gathered and the project manager has decided on an approach to resource estimation, they can begin the actual task of estimating the resources. As detailed in the previous figure, resource estimation is a cyclical process and relies heavily on up-to-date project documents. The project manager begins by examining each branch of the work breakdown structure (WBS), and assigning the necessary resources as determined by the following:

- The method of estimation
- The project scope
- The project budget
- The project timeline
- Various supporting documents (if necessary)

After each branch of the WBS has been evaluated and compiled into an overall resource plan for the project, the project manager compiles the new information into the project documents and continues with the development of the resource assignment matrix, resource breakdown structure, resource plan and, ultimately, procurement of the necessary resources.

5.3.2 Outsourcing work

Outsourcing work is often a necessary (and justifiable) step that many organisations or project managers must take. Outsourcing is most often understood as contracting certain aspects of a project to another company – in other words, asking an outside company to be responsible for the execution of a certain aspect of the project. Think of large companies that use external logistics companies in order to manage the movement of goods from one location to another, or that locate their call centres to other countries.

Outsourcing has several possible dimensions:

- *Nearshoring*: Sourcing services or goods from regional partners. For example, if a South African company outsourced to Namibia or Botswana.
- *Offshoring*: Sourcing services or goods from distant countries. For example, technology corporations in the United States of America (USA) sourcing their microchips from Chinese companies.
- *Homesourcing*: Sourcing services or goods from in-country providers. For example, if Parmalat contracted Laser Logistics for the transport of their perishable items.
- *Crowdsourcing*: Sourcing services or goods from a multitude of online users. This is often used by technology corporations, such as Amazon or Google, to generate new ideas, find flaws in their online or software platforms or to complete smaller tasks that cannot yet be automated.
- *Multisourcing*: Sourcing services or goods from multiple providers. This method is employed if a company's demand for a certain product cannot be met by a single vendor. Think of Eskom desperately buying coal and diesel from a variety of local, regional and international companies during times of crisis.
- *Strategic alliances*: Long-term sourcing partnerships that benefit both companies greatly. Think of partnerships between industry and educational institutions. The former gets access to a pool of newly qualified professionals, whereas the latter receives funding and access to further industry partners.
- *Insourcing*: Procuring services or goods from local organisations, or even other departments within the same organisation.

Deciding whether to outsource depends on whether the company has the appropriate technological, human resource or budgetary sophistication to perform the work in-house. In other words, the project manager must weigh the pros and cons of each of the following activities (Patel, 2017):

- Acquiring the appropriate machinery or intellectual property
- Hiring new staff or training existing staff
- Adjusting the budget
- Outsourcing the relevant tasks to companies that have existing technology, intellectual property or experience (or that can do the same work for less money)

Some of the advantages (pros) and disadvantages (cons) of outsourcing are summarised in the following table.

Advantages	Disadvantages
Reduced overheads, capital and labour costs	No direct control over the quality of the service or product
Fixed contracts with fixed costs that do not threaten to spiral out of control	No guarantee that the outsourced company conforms to company culture, policy or regulation (e.g. regarding environmental stewardship or labour laws)

Wider selection of intellectual and technical expertise.	No transfer of intellectual property or training. This could potentially force the organisation to remain dependent on the outsourced company.
Ability to form strategic and international partnerships.	Risk of upsetting in-house or local workers by denying them training or wages if their work is outsourced.

(Source: EDGE Learning Media (Pty) Ltd, 2020)

Table 5.2: Some advantages and disadvantages of outsourcing

As you can see, the decision to outsource is multifaceted and should not be taken lightly, or from a purely financial perspective. A company may save money by outsourcing, but they may also suffer reputational damage if it turns out that their partner employs child labour, as has been the case with many large clothing retailers. Additionally, in the case of missing expertise, it may be useful to consider the long-term benefits of having better-trained employees.

5.3.3 Using performance indicators

Any task or resource – outsourced or insourced – needs to be assessed in order to determine strengths, shortcomings and necessary adjustments. Signals from KPIs are, therefore, useful to show the manager how close to or far from the mark the performance of a particular aspect of their project is. The traditional approach to KPIs is known as the SMART approach, which states that KPIs need to have the following characteristics (*Mind Tools*, n.d.):

- **Specific:** KPIs need to be precise as to exactly what the manager or organisation wishes to achieve.
- **Measurable:** How would the manager know when the KPI has been achieved? KPIs need to be quantifiable to some degree – whether it is by schedule, budget, quality or some other metric.
- **Achievable:** The task, or KPI, needs to be attainable given the project's constraints – whether these are resource, budgetary or schedule constraints. If the KPI is not achievable, it needs to be reworked.
- **Relevant:** The KPI needs to align with project or organisational targets. It would not make sense to have a KPI that is not relevant to the overall project.
- **Time-dependent:** KPIs must be completed or achieved within a certain time frame.

However, recent thinking regarding the SMART approach has concluded that, while it is often appropriate, it does seem to apply more to the development of goals than KPIs do (Marr, n.d.). For example, a candy company vowing to 'increase candy production by five per cent by the end of 2020' seems more like a goal than something by which they can measure their progress towards that goal – despite adhering to the SMART scheme. In this instance, a KPI would refer to the number of candies produced each day, the number of production hours in a typical production cycle, the amount of failures or stalled production and the speed at which materials are delivered and products dispensed. All of these adhere to the SMART principles, but they are noticeably different from the original goal.

When developing KPIs, it is a good idea to begin with a goal and then develop metrics that can be used to assess progress towards that goal, taking into consideration the technological and staffing expertise of the organisation. During the creation of your own KPIs, take care not to create another, long list of goals. Overall, KPIs adhere to SMART principles, but there are a few additional qualities of a KPI that are worth mentioning. Marr (n.d.) lists these qualities as follows:

- **Adaptable:** As the project or organisation's goals shift or are modified, the KPIs need to adapt to them. If not, you run the risk of evaluating the wrong indicators, which would lead to an incorrect assessment of the project's progress.
- **Unique:** The mix of KPIs remains unique to each goal. You would not use the same KPIs to assess the goal of 'reduce waste materials by five per cent' as you would for 'increase sales by seven per cent'.
- **Coordinated:** KPIs are aligned with the project or organisational strategy.

5.3.4 Creating a resource assignment matrix

The resource assignment matrix (RAM) is a document that describes the responsibility and schedule of each resource in the project. In other words, it is a detailed structure detailing which resource is needed where, as well as who is responsible for it and when it is needed. Certain resources, such as equipment or staff, are often transferred between tasks or teams during the operations of a project. The RAM is used to try and assign resources efficiently to scenarios where their availability is most necessary or will have the greatest impact on project progress. The RAM is also known as the RACI matrix, which indicates the following key factors (*AcqNotes*, 2017):

- **Responsibility:** Who will perform the work, when they will perform it and how much of each resource they need.
- **Accountability:** Who will manage and control the work.
- **Consulted:** Which stakeholders were consulted.
- **Informed:** Who needs to be kept in the loop, regarding the work being performed.

If you consider the following figure, you will see how a typical RAM tends to assign resources and responsibilities to team members. You will see that each resource is named and categorised with a relevant quantity (and, if necessary, a unit such as kilograms or metres). Additionally, the RAM assigns responsibility for each resource to a team member. If a company is large enough, then certain resources may be assigned to different projects. However, each project will have resources assigned to different tasks during its development. This is why, in the following figure, you will see a short description of each activity that the resource is assigned to. Lastly, the RAM provides a quick overview of the scheduled use of each resource for each activity.

Remember that some resources will be used across a variety of tasks or even projects. Knowing when and for how long a resource will be used greatly assists in the planning of a project. A RAM is not a static document; as the project progresses and its needs change, the RAM will also have to adapt in order to provide the most up-to-date information for the project staff.

Resource	Quantity	Category	Responsibility	Project	Activity	Start Date	End Date	Duration
Project manager	One	Human	Babalwa Nkosi (CEO)	Skyscraper construction	Project management	1 February 2020	31 December 2022	Three years
Workers	35	Human	Henning Viljoen (PM)	Skyscraper construction	General construction	1 February 2020	31 December 2022	Three years
Glass sheets	500	Physical	Sizwe Thabethe (team lead #1)	Skyscraper construction	Window installation	1 December 2021	31 March 2022	Four months
Steel cables	700 kg	Physical	Muneerah Abrams (team lead #2)	Skyscraper construction	Elevator installation	1 January 2020	1 June 2021	Five months
Building designs	One	Intellectual	Henning Viljoen (PM)	Skyscraper construction	Project management	1 February 2020	31 December 2022	Three years

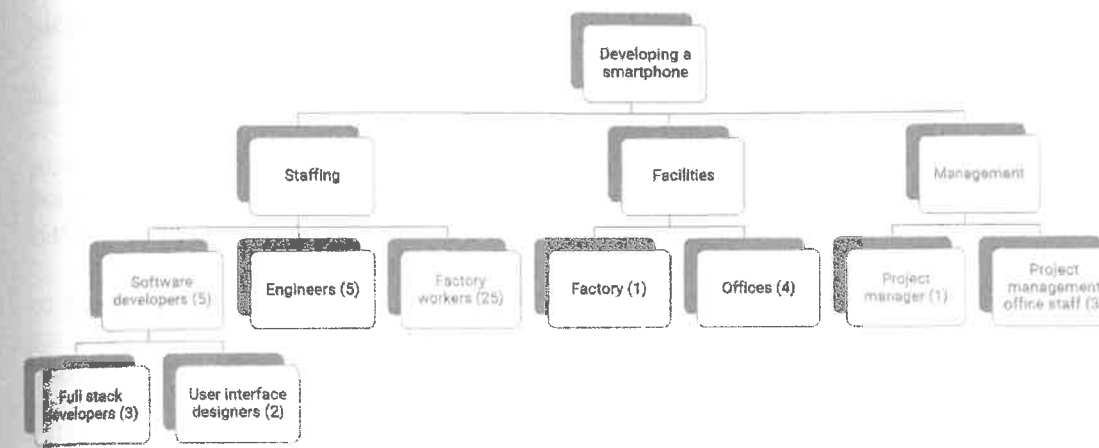
(Source: EDGE Learning Media (Pty) Ltd, 2020)

Figure 5.2: An example of a typical resource assignment matrix

5.3.5 Creating a resource breakdown structure

Resource breakdown structures, much like work breakdown structures, are simplified diagrams that concern the assignment of resources. Whereas a WBS assigns specific people to a set of tasks, the resource breakdown structure (RBS) is used to determine the types and amounts of resources assigned to a particular category (Project Management Institute, 2017: 327).

For example, if you look at the following figure, you will see that this particular company is trying to develop a smartphone, but in order to accomplish this, they need a variety of resources. For example, they will need staff, facilities and management. The RBS designates the type of each resource necessary (e.g. facilities or staff) and then continues to subcategorise the resources within that type. The staffing category, for example, is further divided into factory workers, engineers and software developers, and each category also designates the quantity of each resource that has been estimated. However, it is important to notice that the RBS in the following figure is incomplete, as it does not provide for other resources such as capital, machinery, intellectual property, transport and much more. A real-life RBS is likely to be somewhat more complex than this one.



(Source: EDGE Learning Media (Pty) Ltd, 2020)

Figure 5.3: An example of an RBS that details which resources are required and in what quantities

5.3.6 Creating the resource management plan

The resource management plan is the overall policy document that details a variety of resource-related procedures and policies, from budget to resource allocation and more. The resource management plan (RMP) is the ultimate guide for managing the resources that your project may need, while also adhering to organisation-specific policies (Project Management Institute, 2017: 320). The RMP includes plans for physical, intellectual and human resources.

While different companies may have different formats for their RMPs, the basics are mostly the same. The first thing to note is that the RMP is written up as a planning document. This means that it needs to have the appropriate titles, introductions and attributions, as dictated by organisational policy. Thereafter, the document will usually include (but is not always limited to) the following sections (Project Management Institute, 2017; and *Praxis Framework*, n.d.):

- **Resource identification:** Details of which physical, intellectual and human resources are necessary for the success of the project.
- **Resource acquisition:** Plans and policies that dictate how the resources may be acquired – either via procurement, purchasing or human resource policies, as drawn up by the governing organisation.
- **Resource responsibility plan:** Details of who is responsible for which resource, the competences necessary to work with a resource and the chain of authority when dealing with a resource.
- **Human resource roles:** The various functions and responsibilities of each team member.
- **Resource control plan:** Details of inventory management, equipment life cycles, maintenance procedures and optimisation of resource acquisition and dispensing in order to ensure that there are always enough resources at hand.

- *Rewards plans*: Plans that set out how high-performing individuals or teams are rewarded, should they achieve their goals or KPIs.
- *Training and development plans*: Policies and procedures that lay out when, how and who will be sent for further training and development.
- *Project organisation charts*: Provision of informational oversight to the project and its resources, although they are not crucial to the management of resources. They indicate the various staff of the organisation or project, as well as their assignments and the resources they may control or need.
- *Budget*: A fairly straightforward document detailing how much you expect to spend on resources.
- *Procurement plans*: Plans that ensure resources are ethically obtained, transparently executed and fairly rewarded (should the organisation or project need resources from an outside source).
- *Resource transport plans*: Also known as mobility plans; these are plans to ensure that the delays between resource requests and deliveries are kept to a minimum, because some projects may require resources to be transported back and forth between locations.



EXERCISE 5A

- Describe the three inputs for resource estimation and provide an example of each in your answer.
- Using the three-point estimation method, calculate the estimation for the following variables. Show your calculations.

O: R 6 000
P: R 18 000
ML: R 9 000
- Apart from SMART principles, evaluate the three additional qualities of KPIs.

5.4 FINANCIAL PLANNING

A project's financial plan exists to enable the manager to better plan, estimate, budget and control all financial matters related to the project (Project Management Institute, 2017: 244). The manager considers the short- and long-term costs of resources and activities, and tries to budget accordingly. For example, in the short term, using materials of a lower quality may save money, but in the long term, such materials may fail. This would lead to a significantly greater cost, as completed work would need to be redone, resources reacquired and transferred and, possibly more work created (depending on how many project components were affected by the material). Financial planning can, therefore, determine the success of a project.

5.4.1 Developing a cost management plan

The cost management plan determines how costs – and associated risks – are estimated, budgeted, scheduled and controlled (Project Management Institute, 2017: 247). In order to begin developing this plan, the project manager must turn to their project documents. Specifically, they need to look at the project scope, resource management plans, project schedule, WBS and risk management plan. The manager also needs to take into account the business environment – the condition of the market, who the strategic partners are and who the stakeholders are – as well as any organisational assets that are available. After this, the manager analyses the available data that has been gathered, queries experts or previous projects and organises meetings with stakeholders, in order to finalise the cost management plan (Project Management Institute, 2017: 248).

The cost management plan is a detailed document that describes any of the following (Project Management Institute, 2017: 238–239):

- The policies and procedures surrounding performance measurement and various control processes
- The schedule of feedback, performance evaluation and controls
- Feedback and communication protocols with regard to frequency, method, detail and responsibility
- Rules regarding the precision of estimates and budgets
- The units by which activities, resources or schedules are measured (e.g. hours, metres, sheets etc)
- The acceptable thresholds by which budgets, resources, schedules, quality and estimates can be exceeded or failed

Once the cost management plan has been developed, the manager can proceed with the next tasks in the financial planning phase of the project.

5.4.2 Working with estimations

Once the relevant resources have been estimated according to the specifications listed in section 5.3 of this unit, the project manager's next task is to estimate the costs of these resources and the activities associated with the project. Moreover, as with all project documents and plans, the cost estimation will need to be periodically re-evaluated to ensure the project's budget remains on track and to correct for any deviations (Project Management Institute, 2017: 251).

When developing a new estimation, the project manager must consider the following inputs:

- *Project documents*: Documents such as the project schedule, the WBS, the risk assessment matrix, vendor evaluations and resource management plans.
- *Resource rates*: The cost of each resource, such as a team member's hourly, daily or monthly rates, as well as the price of fuel, the cost of raw materials and the cost of licences.
- *Cost of quality*: The costs of finding faults during any stage of the project due to faulty materials.

- **Business environment:** The market conditions that determine the price and availability of a resource, the resource's location, transport and storage costs, the availability of vendors, local government policy or regulations governing the use of a resource, and exchange rates.
- **Organisational assets:** The various organisational policies and procedures that govern the estimation and acquisition of resources.
- **Reserve analysis:** An 'emergency' fund, should the project run over budget. It provides a buffer for the project that protects it from bankruptcy and failure. The riskier a project is, the more generous the reserve analysis needs to be.

Once the manager has gathered all the appropriate inputs, they can collate these into a cost estimate using any of the techniques described in the following table. The table is as an example of a bottom-up estimate for the installation of Fibre-To-The-Home, an Internet service, in a new area.

Description	Category	Activity	Quantity	Unit price	Cost
Workers	Labour	Digging and construction: Seven days	15	R 450 pp/day	R 47 250
Fibre-optic cables	Infrastructure	Fibre installation	1.5 km	R 6 500/100 m	R 97 500
Salespeople	Labour	Sales and installation: One day	Three	R 890 pp/day	R 2 670
Routers	Infrastructure	Fibre installation	60	R 750/unit	R 45 000
				TOTAL	R 192 420

(Source: EDGE Learning Media (Pty) Ltd, 2020)

Table 5.3: A bottom-up cost estimate for the installation of fibre Internet to an area of approximately 60 homes

As you can see, each resource is properly categorised, assigned to its activity and has a unit price attached to it. Another estimation method is an analogous estimate, where the project manager can compare the project with other, similar projects and then develop an estimate based on their similarities. However, as with most estimates, the more techniques that are used to determine the cost estimate, the greater the chance that it will be an accurate estimate. Of course, this does not mean that the project manager should use *all* available techniques, since some of them may not be applicable.

Holistic approach

Tracking any estimates (not just cost estimates) by using KPIs is an important facet of project planning. Faulty estimation can threaten the existence of the project – or even the organisation, if the project is critical enough. A proper, holistic (all-encompassing) approach is important for the following reasons:

- **Scope creep:** Accurate estimates of goals, deliverables, scope and schedules is vital if the project manager wishes to avoid so-called 'scope creep'. This phenomenon refers to the practice of

continually extending the scope of the project with further tasks and deliverables that were not within the original scope. Scope creep has a negative impact on project duration, budget, resources and morale.

- **Feasibility:** Proper estimation has a beneficial impact on a project's feasibility. Stakeholders wish to know accurate estimates of the project schedule, budget and resource requirements before giving the green light. Vague, incomplete or incomprehensible estimates can cancel a project before it has even begun.
- **Resource breakdown:** Understanding the distribution, assignment and schedule of resource use helps the project to function more smoothly. Further, a project manager needs to consider how resources and budgets are distributed to determine whether time, money or frustration can be spared somewhere. For example, a project manager may be tempted to automate certain aspects of their labour requirements. However, the newer machines are incredibly expensive and local labour law has strict regulations surrounding the automation of work that could (and should) be done by humans. The project manager needs to assess the differences in cost and risk between labour or automation, as well as potential litigation.
- **Tracking:** Estimates are used to evaluate the progress of the project. The *current* state of the project is compared to the *projected* state (as determined by the estimates), and from there the performance is evaluated. Further analysis will determine if, when, where and how adjustments to the project need to be made.
- **Posterity:** Your project may be used to develop estimates for future projects. Submitting thorough estimates with your project documentation to the PMO, therefore, ensures that future projects can estimate more accurately.
- **Risk management:** Estimating the potential risks of conducting a project in high-risk areas helps to create a greater overview of the project that the stakeholders can use when deciding whether to initiate the project or when evaluating its performance. These areas include warzones, areas with high earthquake activity and areas with more minor risks, such as crime or bad roads, amongst many others.

5.4.3 Establishing a budget

Once the manager has gathered all the necessary inputs from their project documents and research, they then need to compile these into a comprehensive document that provides an overview and details to the costs and estimates of a project; this document is the budget. When developing a budget, the manager also needs to bear in mind the following limits: the schedule, the budget and the scope of the project. The manager will also want to keep in constant communication with their stakeholders – especially the ones responsible for financing – when drafting the budget. Stakeholders often provide invaluable experience and advice throughout the project.

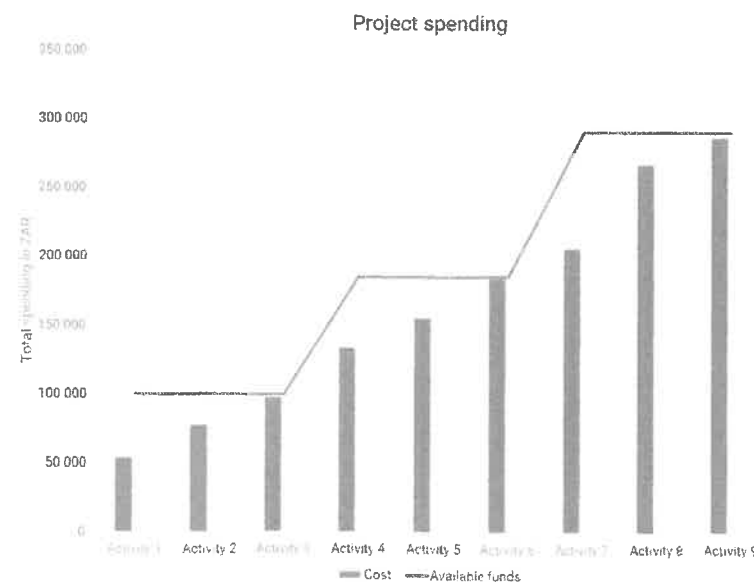
Budget activities

A budget consists of the following four types of activities (Watt, 2014):

1. **Cash flow:** The manager is responsible for the money flowing in and out of the project. However, not all of the budget will be available at any given time – some of it may be allocated to investments or other projects. Consequently, the project manager needs to decide how much money to request and when to request it.

2. **Contingency reserves:** These funds are allocated for unexpected costs that may be incurred during a project. Mistakes, material failures, equipment breakdowns and many other, unforeseen events that impact the cost of a project are covered by contingency reserves. The greater the risk assessment of a project or activity, the greater the contingency reserves that are allocated to it.
3. **Management reserves:** These funds are available at the manager's discretion and are only ever used if there is a sudden change in the scope of the project.
4. **Budget evaluation:** The project manager must remain aware of how much money has been spent and compare this to the budget as well as the schedule. They will then determine whether the project budget is sufficient and whether it is being used as effectively and efficiently as possible.

Once the manager has gathered all the relevant inputs and cost estimates, they aggregate these into the final budget. The cost of each resource is totalled according to the estimates, and thereafter the cost of each activity in the WBS is determined based on the cost of the resources and the resource management plan. The manager must then consider the project schedule and arrange the tasks, resource allocations and payment schedules in a way that allows the most effective use of the project's budget. The projected spending versus total budget of a project can be graphed, as seen in the following figure. Here you can see that the project's budget has been divided into three separate payments, or tranches, that are paid out at the end of every third activity. As you can see, the total projected costs at activities three, six and nine are worryingly close to the total budget of the project, which indicates that there is little room for error in the budget. If the total cost at the end of each of those activities exceeds the total budget, then the project may be jeopardised. Matching the project schedule with the scheduled payments like this is known as *reconciliation* (Watt, 2014).

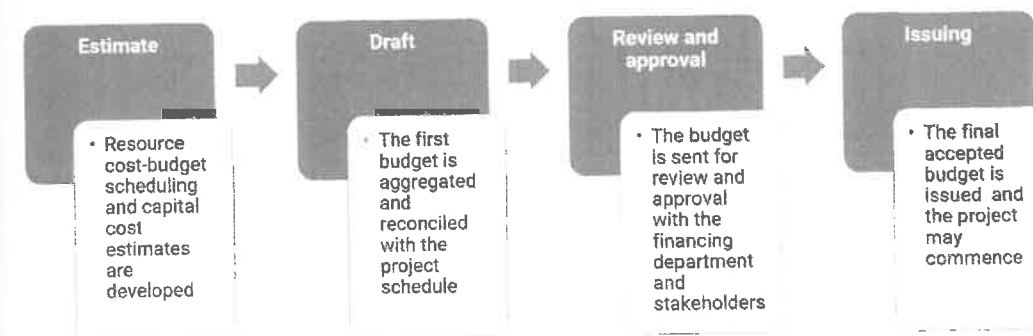


(Source: EDGE Learning Media (Pty) Ltd, 2020; adapted from Watt, 2014: 123)

Figure 5.4: A project budget analysis showing the final cost at the end of each activity (blue) compared to the available budget (red)

The validity of the project budget is then confirmed by several methods, such as seeking expert advice, examining historic, similar projects, thoroughly examining (and re-examining) the data and confirming the available financing with all relevant stakeholders (Project Management Institute, 2017: 263).

In summary, the general budgeting procedure flows from the initial gathering, estimation and discussion of information amongst stakeholders to the end of the first draft. This is where the costs associated with the RBS and the WBS are aggregated and reconciled with the project schedule and the proposed financing schedule (as seen in the previous figure). The draft is then sent for one or more round of review with the stakeholders responsible for financing. During this review, changes to the project may occur as dictated by the available funding. The schedule, RBS, WBS or any other factor may be changed in order to accommodate the budget. Once the final draft has been accepted, the budget is issued to all relevant stakeholders and team members so that the project may commence. This process is further summarised in the following figure.



(Source: EDGE Learning Media (Pty) Ltd, 2020)

Figure 5.5: Summary of a typical budgeting process

Once the project manager has gone through all these processes, they are left with a final, completed budget that is designed to be as comprehensive as possible. An example of such a budget can be found in the following figure, which is a draft budget for the first year of a newly established bottled water company. As you can imagine, some of these expenses (capital and facilities) will occur only once during this project. Other forms of such a budget may include revenue projections as well.

Expenses	Costs
Capital	
Bottling plant	R 650 000
Reverse osmosis equipment	R 450 000
Capital total	R 1 100 000
Facilities	
Warehouse	R 3 500 000
Facilities total	R 3 500 000
Material	
Bottles (10 000)	R 20 000
Bottle caps (10 000)	R 1 000
Water (10 000 l)	R 500
Filters (500)	R 15 000
Materials total	R 36 500
Labour	
Wages (five employees)	R 900 000
Training (five employees)	R 25 000
Manager (one)	R 360 000
Labour total	R 1 285 000
Contingency reserve	R 150 000
Managerial reserve	R 50 000
Total	R 6 121 500

(Source: EDGE Learning Media (Pty) Ltd, 2020)

Figure 5.6: Draft budget for new bottled water company, for the first 12 months of operation

5.4.4 Cost control

Finally, throughout the course of the project, the project manager needs to exercise 'cost control'. In other words, they need to monitor the actual cost of the project and compare it to the predicted cost of the project at that point in time. The manager compares running costs to the project baseline and, if necessary, either adjusts the project (regarding schedule and resource allocation) accordingly or applies for an extension to the budget. Budget extensions can be approved only by the relevant stakeholders (Project Management Institute, 2017: 267).

Reasons for cost control

Controlling the costs of a project is important for the following reasons:

- To understand deviations from the approved project plan
- To detect and correct deviations from the approved project plan early enough that their impact on the project is kept to a minimum
- To prevent the project from going over schedule
- To prevent the project from going over budget
- To keep budget overruns to a minimum
- To keep stakeholders consistently informed of the project status
- To detect where deviations occur, according to the RBS and WBS

Methods of cost control

There are several methods the project manager can use to control the costs of their project, including the following:

- **Earned value analysis (EVA):** This method regularly compares the budgeted cost of a project or activity with its actual cost. There are several terms that are worth knowing when doing an EVA, as follows:
 - The *budgeted cost of work scheduled* (BCWS) is the cost estimate of each activity.
 - The *planned value* (PV) is the total of the BCWS.
 - The *budgeted cost of work performed* (BCWP) is the budgeted cost for the work actually completed. In other words, the estimated value of the work that has been completed.
 - The sum of all BCWP is the *earned value* (EV).
 - Lastly, the *actual cost* (AC) is the 'real' cost of the work as it was paid from the budget.
- **Schedule variance (SV):** Once the EVA has been completed, the manager can use this information to determine the schedule variance (SV) and the cost variance (CV). The SV is determined by subtracting the PV from the EV, and the CV can be determined by subtracting the AC from the EV. A positive SV indicates that the project is ahead of schedule and a positive CV means the project is under budget (refer to the following formula).

$EV - PV = SV(+)$ → project ahead of schedule; $EV - AC = CV(+)$ → project under budget

- **Variance indices:** Similarly, the manager can take the values from the EVA and use them to determine the ratio of budgeted schedules and costs to actual values. The schedule performance index (SPI) is the quotient of EV to PV, and the cost performance index (CPI) is the quotient of EV to AC. SPI values greater than one indicate that the project is ahead of schedule; for example, an SPI of 1.2 would indicate that the project is 20 per cent ahead of schedule. Similarly, an SPI value of less than one would mean a project is behind schedule. The same holds true for CPI values that are greater than one (under budget) or less than one (overbudget). Refer to the following formula.

$$\frac{EV}{PV} = SPI; \frac{EV}{AC} = CPI$$

$SPI > 1$ = project ahead of schedule; $SPI < 1$ = project behind schedule

$CPI > 1$ = project under budget; $CPI < 1$ = project over budget

- **Estimate to completion (ETC):** Once the manager knows the EV of a project, they can calculate how much money is needed to complete the project by subtracting the EV from the total budget of the project (*budget at completion*, or BAC). If the manager sees that some activities are running overbudget and they fear that this may affect the final cost of the project, they can calculate ETC as before (BAC minus EV), except now they divide it by the CPI as well. This will adjust the budget for those activities or resources that ended up draining the budget more than expected:

Amount required for completing the project:

$$\text{Adjusted budget: } \frac{BAC - EV}{CPI}$$

- **Estimate at completion (EAC):** This final estimate is developed if the manager notices that the schedule or costs vary so significantly that they may affect the final budget. In order to calculate the EAC, the manager adds the AC and the ETC together. This will give them a proper estimate of how much the project will finally cost:

$$EAC = AC + ETC$$

Each of these calculations is performed periodically at the manager's discretion. The manager and stakeholders need to be aware of the project's schedule and cost performance, as projects that are significantly behind schedule or overbudget either need significant adjustment or run the risk of being cancelled entirely.

The following table is useful as a quick reference to the abbreviations used in the costing methods.

Abbreviation	Meaning
AC	Actual cost
BAC	Budget at completion
BCWS	Budgeted cost of work scheduled
BCWP	Budget cost of work performed
CPI	Cost performance index
CV	Cost variance
EAC	Estimate at completion
EVA	Earned value analysis
ETC	Estimate to completion

EV	Earned value
PV	Planned value
SV	Schedule variance
SPI	Schedule performance index

(Source: EDGE Learning Media (Pty) Ltd, 2020)

Table 5.4: Abbreviations used in costing methods

EXAMPLE 5 A (Cost control calculation)

Study the following two figures closely, which contain examples of how these calculations are performed.

Nomzamo wishes to repair her car after an accident. Her insurance company has set aside R 15 000 for these repairs (the BAC). She asks the repairman to keep her up to date on all costs and activities as they arise. A few days before she is scheduled to get her car back, the repairman sends her the latest information (the first figure). Nomzamo uses this information to determine how far behind or ahead of schedule the work is and whether the budget will be sufficient (the second figure). She sees that she has an SPI of 0.87. Because this value is less than one, it indicates that the work is behind schedule. However, the CPI is greater than one, which means that the repairs are currently under budget. Using this information, Nomzamo determines that once the repairs are completed, she will have just under R 700 left from the insurance's money – just enough for a relaxing spa day after experiencing a car crash.

BCWS			BCWP			AC	
Item	Quantity	Cost	Quantity	Cost	Quantity	Cost	Cost
Paint	1	R 2 400	1	R 2 400	1	R 1 800	
Lightbulbs	2	R 900	1	R 450	1	R 1 800	
Total		R 3 300		R 2 850			R 3 600

(Source: EDGE Learning Media (Pty) Ltd, 2020)

Figure 5.7: The planned, earned and actual values of the work being done on Nomzamo's car

TERM	EQUATION	VALUE
BAC		R 25 000
PV		R 11 500
SV	$EV - PV$	-R 13 500
CP	$EV - PV$	0 R7
ETC	$(BAC - EV) \div CP$	R 3 529 R1

(Source: EDGE Learning Media (Pty) Ltd, 2020)

Figure 5.8: Nomzamo used variance and index calculations to determine whether the repairs were behind or ahead of schedule / whether they were over or under budget

5.5 PROCUREMENT PLANNING

Managing and planning procurement is the necessary next step in acquiring the necessary goods and services that lead to the development of the project. Like all other project tasks, procurement planning relies on proper project documentation, stakeholder involvement, performance evaluation and control. Procurement is developed based on the needs of the project, the capabilities of the buying and selling organisations, the business environment and the limitations of the budget.

5.5.1 Procurement strategies

When deciding to procure goods or services, the project manager needs to be aware of the following basic procurement strategies (Purchasing & Procurement Center, n.d.):

- **Supplier optimisation:** Rather than relying on a single selling organisation, the buying organisation develops a mix of sellers that can meet its needs. These mixes remain open to entry and exit since, as each seller is evaluated, the buying organisation may terminate their relationship depending on the quality of goods and services delivered.
- **Total quality methods (TQM):** Selling organisations with an error rate closer to zero are given preference. This requires communication between buyers and sellers, so that both sides are aware of acceptable quality plans, baselines and management principles.
- **Risk management:** The buying organisation optimises their list of sellers according to risk. In this case, the buyer needs to decide what an acceptable level of risk is for including a seller. For example, sellers located in high-risk areas, while offering lower prices and quicker production cycles, may not be ideal, since a single event may cause catastrophic knock-on effects further up the delivery chain.

- **Global sourcing:** This strategy relies heavily on outsourcing procurement to regional and global partners.
- **Vendor development:** Buying and selling organisations develop close, mutually beneficial relationships that often progress into strategic alliances or partnerships. The two organisations share knowledge, information and plans in order to reduce production cycles and delivery schedules, as well as to optimise profitability.
- **Green purchasing:** These strategies stress sustainability, recycling and waste reduction among buyers and sellers.

Selecting the appropriate purchasing strategies for your organisation will lead to lower costs, greater profits, greater quality, rapid deployment and satisfied stakeholders.

5.5.2 The procurement selection criteria

Once the requirements for procurement have been developed – in other words, managers have determined what is necessary, when it is needed and how much is required – the project manager attempts to find organisations with whom to do business. When several organisations offer to fulfil a contract based on their pricing and service agreements, this is known as *bidding*. During this process, the manager must evaluate each source (selling organisation) on certain factors, which are listed in the following figure (Project Management Institute, 2017: 464).

- Whether it is a preapproved seller
- Whether the selling organisation adheres to local or international quality standards, best practices, operating procedures and legislation
- The proven service history of the seller
- The cost estimate provided by the seller
- The organisational culture of the seller
- The quality and capacity of the goods and services the seller can supply
- The technical sophistication of the seller
- The number of alternative sellers
- Legal and organisational policy limitations when dealing with a seller
- The financial security of the organisation
- The projected capacity to deliver the expected goods or services on schedule
- The knowledge transfer capacities and policies of the seller

(Source: EDGE Learning Media Pty Ltd, 2020; adapted from Project Management Institute, 2017)

Figure 5.9: Factors in evaluating sources

In doing such an evaluation, the manager shortlists organisations until they have decided on one source (or a very small list of sources). During this process it is recommended that the manager makes the method of evaluation available to the selling organisation, as well as remains in communication with them in order to clarify any uncertainties. Contracts are then awarded to the successful bid.

5.5.3 Making vs buying

As a manager, you may face the decision of whether to produce a good or service 'in-house' or to outsource it to another company or region. The inputs for this decision remain your project documents, the business environment and any relevant stakeholders. You need to evaluate the short-term and long-term costs of your decision to make or to buy. This is known as a 'make-or-buy analysis' (Project Management Institute, 2017: 473).

As an example, consider that you are opening a new corner market and you want to begin selling bread. You have two choices: you can decide to install a new oven, buy the relevant machinery, train and employ new personnel and regularly buy ingredients in order to make your own bread. On the other hand, you could enter into a contract with a large manufacturer, like Sasko or Albany, and have them supply your bread. There are obvious advantages and disadvantages to each approach. For example, while the initial cost of making your own bread would be quite high, in the long-term, making your own bread could be cheaper. You are also able to adjust how much bread you bake in order to change your supply according to consumers' demands. On the other hand, if you decide to outsource, you may pay less for the first few years, but in the long-term, you may pay more per loaf of bread than if you baked it yourself. Additionally, entering into a contract may mean that you are not able to adjust pricing, products or supply in order to suit your consumers' needs.

In order to make a well-informed decision, you will need to gather all the relevant estimates, RBSs, WBSs, budgets and contracts.

5.5.4 Bids, contracts and service level agreements

After the relevant materials or services have been determined, the project manager opens procurement to bidding. The bidding process includes the following documents (Project Management Institute, 2017: 477):

- *Request for information (RFI)*: A document that solicits information on the types, quality, quantities, schedule and delivery of goods and services from the seller. RFIs may also solicit any other information related to the selling organisation that the buying organisation considers important.
- *Request for quotation (RFQ)*: An RFQ is a more formal document that will ask for specifics regarding pricing, scheduling and delivery of goods and services from the selling organisation. This information is often used during the cost and resource estimation procedures.
- *Request for proposal (RFP)*: If a specific, immediate solution is needed from the selling organisation, then the buying organisation may request an RFP, which outlines how a seller will attempt to provide a solution in more detail.

- *Statement of work (SOW)*: The SOW is provided to potential sellers in order to allow them to determine whether they can provide the goods or services as stipulated. The SOW closely follows the project scope, baseline, schedule and budget.

Once a bid has been awarded, the buying and selling organisations enter negotiations, after which contracts are awarded and service level agreements (SLAs) signed. During this phase, it is important that the project manager keeps all relevant project documentation at hand in order to clarify or define questions the seller may have surrounding project scope, schedule, budget and various other plans. It would also be helpful to involve the relevant stakeholders at this stage of procurement, as their expertise may help ease negotiations. The following are the two categories of contracts (Watt, 2014):

1. *Fixed-price contracts*: Contracts of this nature include a predetermined price that the buyer and seller agree on, which encompasses the procurement of goods or services. These contracts place the burden of cost management on the project manager, since the price of the goods or services remains the same regardless of the project's performance or profitability. These contracts can be modified to include rewards for the seller if they perform ahead of schedule or beyond the scope of their contract or if, in the case of long-term contracts, they include price adjustments that compensate for inflation, exchange rates or price fluctuations. Fixed-price contracts require a very well-defined scope and accurate estimates.
2. *Cost-reimbursable contracts*: When there is less certainty regarding the project scope or estimates, project managers may use cost-reimbursable contracts, which pay the selling organisation for work performed. Regular, detailed documentation is necessary for these contracts in order to avoid budget overruns, since the costs can fluctuate at a moment's notice. Depending on the relationship with the seller, the project manager may adjust these contracts to include performance bonuses, incentives or percentages of profit.

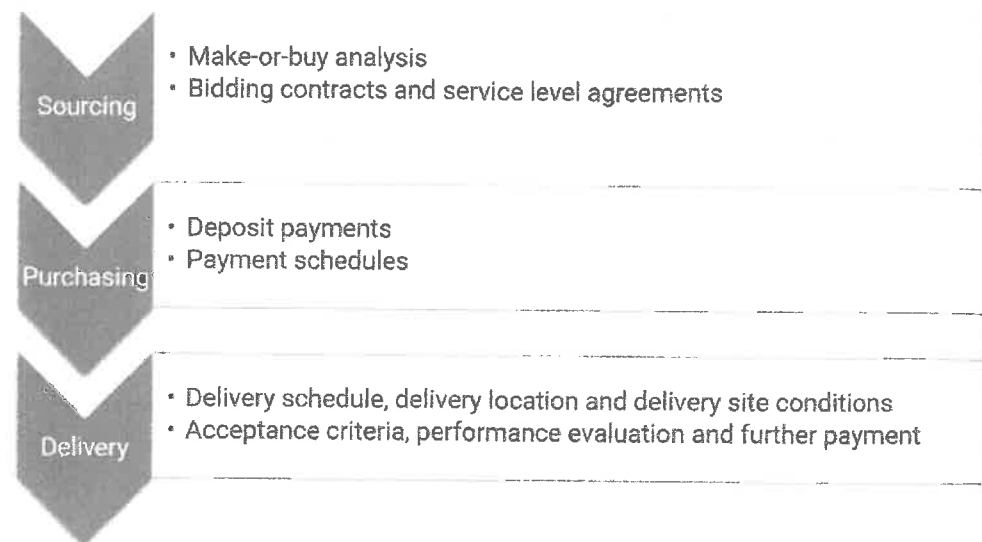
Lastly, the buyer and seller enter into a service level agreement with one another. These are not direct contracts as such, but they are documents designed to help the buyer and seller better communicate with and understand one another. SLAs define the scope, baselines, tasks and KPIs under which the buyer and seller will engage with one another. They also define the quality, quantity and scheduling of goods and services, so that the buyer knows what to expect at a given time, and the seller knows what to deliver at a given time.

5.5.5 Creating a procurement plan

After thorough consultation (and updating) of the project documents, as well as consultations with the relevant stakeholders, the project manager can establish the final procurement plan. This plan will include all previously discussed documentation, as well as:

- a report on how and why a seller was selected;
- all documentation between the buying and selling organisations; and
- any KPIs by which the manager will evaluate selling organisations and the procurement control plan.

The last point, like with control plans we have discussed previously, will help the manager to adjust for any deviations from the contract and SLA between the buying and selling organisations. The procurement plan also includes a comprehensive schedule of orders, payments, deliveries and deposits. The following figure provides an outline of a typical procurement plan.



(Source: EDGE Learning Media (Pty) Ltd, 2020)

Figure 5.10: An outline of a typical procurement plan

? EXERCISE 5B

- (i) Conduct your own research into the term 'padding' as it relates to finances and answer the question that follows (your focus should be on the two different definitions of padding). Your answer should be no more than 200 words.

Required:

When is padding considered unethical? When is it considered morally acceptable?

- (ii) Explain the conclusions about a project that may be inferred from the following:

- CPI < 1
- SPI > 1
- SV = 0

- (iii) Compare and contrast fixed-price contracts and cost-reimbursable contracts.

5.6 STAKEHOLDER INVOLVEMENT PLANNING

Communicating with the project stakeholders should be a two-way street. In other words, the project manager should keep the stakeholders up to date on all developments in the project, while the stakeholders should offer feedback and advice to the managers throughout the duration of the project. Imagine a project where the manager and stakeholders have a different understanding of the scope and goal, but do not communicate with one another on this matter.

Similarly, consider situations where the project manager develops a budget for a project, but the stakeholders do not comment whether the budget is feasible or approved, and halfway through the project, it must be abandoned due to an insufficient budget. Reliable communications keep your stakeholders happy, and happy stakeholders are vital to a project's success (Watt, 2014).

5.6.1 Stakeholder register

The first step to properly managing your stakeholders is knowing who they are, what they bring to the table and how to communicate with them. The stakeholder register is a project management document that collates all the relevant information of each stakeholder into a single, searchable document. While the stakeholder register is a simpler document than a stakeholder analysis or stakeholder engagement plan, it may contain elements of these other documents in order to provide a quick overview of each stakeholder. Alternatively, the stakeholder register may point to other, more relevant project documents in order to explore the powers, interests and engagement plans of each stakeholder more thoroughly. While each organisation may have their own formats for stakeholder registers, there are some elements that are universal:

- **Name:** The name and title of the stakeholder.
- **Category:** Organisation-specific categories for each stakeholder, such as 'investor', 'support', 'team lead' etc.
- **Organisation:** The organisational affiliation of each stakeholder.
- **Role:** A short description of the stakeholder's role in the organisation or project.
- **Contact information:** Email addresses, telephone numbers and work addresses of each stakeholder.
- **Communications:** The preferred method, schedule and content of past and future communications with each stakeholder.
- **Comments:** Any comments the stakeholder manager wishes to convey to the project team regarding each stakeholder.

Stakeholder	Category	Organisation	Role	Contact	Communication method	Last communication	Comments
Dr John Ntswane	CEO	EIC Construction	Operates EIC Construction	nts@eic.co.za +27 31 555 6160	Email	24 January 2020	Unhappy with progress to date
Manah Davids	CFO	EIC Construction	Manages budget	davids.m@eic.co.za +27 31 555 6161	Email	15 January 2020	none
Jason de Sousa	COO	EIC Construction	Oversees daily operations	sousa.j@eic.co.za +27 31 555 6162	Email and telephone	15 January 2020	Unavailable until April 2020
Abigail Crumbworth	Investor	Amanda Investments	Provides funding	abi.cworth@Amanda.com	Email	10 January 2020	Currently seeking to offload her share in the project
Ashley Williams	Government liaison	eThekweni Municipality	Policy, legal and environmental advisor	ash.w@durban.gov.za +27 31 311 7870	Email and telephone	22 January 2020	On site Monday and Wednesday

(Source: EDGE Learning Media (Pty) Ltd, 2020)

Figure 5.11: An example of a typical stakeholder register for a construction project

5.6.2 Requirements specification

Miscommunication – or even lack of communication – among project stakeholders with regard to the project requirements often leads to budgets or schedules being exceeded, or even outright project failure. Understanding the project requirements will allow the manager to allocate sufficient resources, time and attention to each task as it arises (Klariti.com, n.d.). Since the requirements specifications should be a list of clearly defined goals, a good idea is to use the SMART (specific, measurable, achievable, relevant, timely) approach as a framework for developing them. Remember, people with different backgrounds will often have different expectations or visions for a project. Understanding the precise requirements of the project deliverable is invaluable in delivering a high-quality product on time, under budget and to your client's satisfaction.

Imagine you own a carpentry business and a client contracts you to build a table. Without further information, you decide to build a table that can seat six people, is made from mahogany and is 93 cm tall. The client returns after a few weeks and tells you that they actually needed a table for eight people. You return to your workshop and you build a table that can seat eight people. The client returns for the second time and tells you that 93 cm is too tall for them, as they need a table that is only 85 cm tall. Again, you return to your workshop and you build a third table to meet these specifications. The client then tells you that mahogany is getting too expensive, you need to use pine. At this point you have built three tables, gone significantly overbudget and spent much more time on the project than you would have liked. If you and the client could have had

an initial conversation about the project, you would have built only one table and saved time, money, resources and frustration.

5.6.3 Business knowledge

Stakeholders come from a variety of backgrounds and bring invaluable experience to each project. While the project team may be impeccable at executing the deliverable, they may not have the necessary experience to market it. Similarly, without the involvement of governmental or legal stakeholders, the deliverable may fail because it does not adhere to local regulations or policies. Involving stakeholders right at the beginning of your project means you can avoid a variety of issues that come with a lack of knowledge or communication from stakeholders (Leybag, n.d.).

Consider that you are overseeing the development of a new chocolate bar. You and your team of candy artists have developed one of the most delicious chocolate bars on the market. However, you have developed this in isolation from all relevant stakeholders, such as health practitioners, parents, supermarkets, legal experts and marketing specialists. Consequently, a few days after the chocolate was introduced to the market, you start receiving negative feedback. Firstly, the vendor you selected to procure your cocoa stands accused of using child labour to harvest cocoa beans. Secondly, the sugar content is too high for local legislation and doctors are accusing you of worsening the obesity and diabetes epidemics in your country. Thirdly, your marketing team informs you that 'delicious chocolate bar' is a very poor name for a product. Within weeks of the initial launch, your product has been pulled from all supermarket shelves and has been consigned to the depths of history as just another failed product. Proper engagement with all stakeholders right from the start of the project would have spared you from these experiences.

5.6.4 Common understanding of scope and deliverables

A shared understanding of what the project is and what the deliverables will be is necessary if both the project team and the stakeholders wish to avoid misunderstandings and project setbacks. The various stakeholders in a project need to be involved at every step of the planning process. For example, including the end users of a product or service in the planning process will provide clarity on the practical requirements of the deliverable or how it would be implemented.

A real-life example of this type of miscommunication would be the fact that Evian, the water company, decided to diversify its holdings in 2005 by producing a bra that could be filled with water. The company did not involve potential customers, health experts or fashion experts during this process and, to no one's surprise, discontinued this product mere weeks after its initial launch (CB Insights, 2019).

5.6.5 Resolution of issues

Stakeholders wield special influence and knowledge that can be used to resolve certain issues more effectively. Consider stakeholders with influence in local government; they may be able to assist with legal or compliance procedures on the project. Alternatively, a stakeholder with

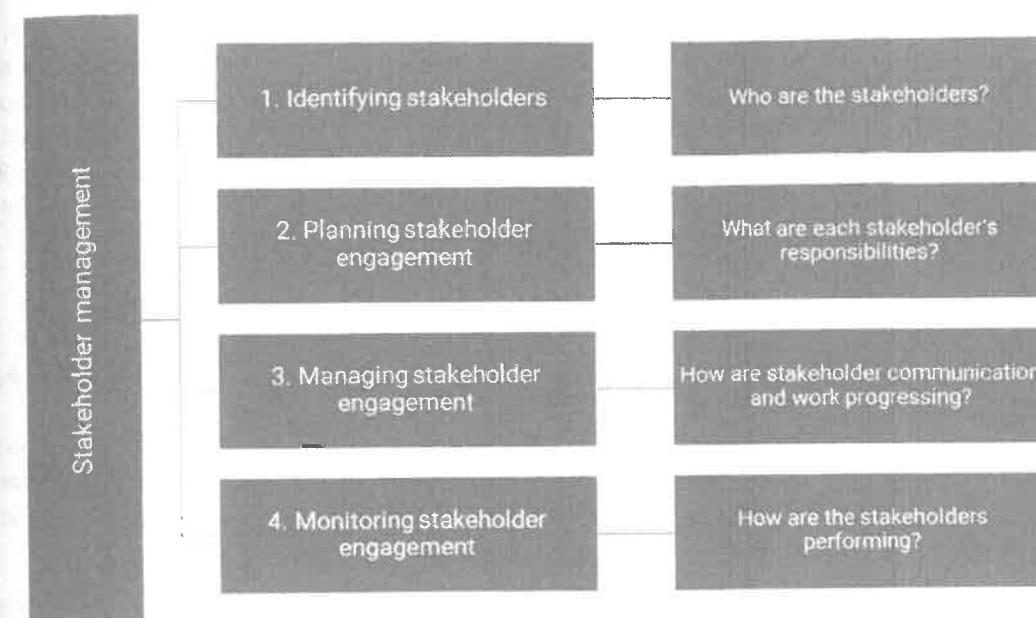
international contacts would be able to facilitate the delivery of certain goods and services at a lower cost. Human resource officers are also stakeholders, and they are able to resolve internal conflicts among team members. Involving each available stakeholder from the beginning of the project helps to keep them informed on the various successes and challenges of the project, and allows them to advise and mediate where necessary. An uninvolved stakeholder will lack the necessary knowledge and context when asked to resolve a particular issue, and may do more harm than good.

5.6.6 Putting together the stakeholder engagement plan

Collating the stakeholder engagement plan works much like putting together any other plan. Firstly, you need to consider all the inputs for the plan (Project Management Institute, 2017: 491). These include, but are not limited to, the following:

- *Project documents:* The project plan, stakeholder analyses, stakeholder registers, various breakdown schedules, budgets and any other documents the manager deems necessary for the task at hand.
- *Business environment:* The manager needs to assess the powers, influence, risk appetite, communication protocols, locations of each stakeholder and the organisational culture when planning stakeholder engagement.
- *Organisational assets:* What policies and procedures does the organisation have in place when managing stakeholders? Are software suites available that can streamline stakeholder engagement? What communication channels and stakeholders are available within the organisation? Answers to these questions will further inform the manager's stakeholder engagement plan.

Once the appropriate inputs have been gathered, the manager can develop the stakeholder engagement plan. This plan builds on the stakeholder register, by assessing and ranking each stakeholder's level of influence and interest in the project, as well as who is involved in decision making and has responsibility for different activities (Verzuh, 2005). Stakeholders can be categorised as 'Keep Satisfied, Manage Closely, Monitor and Keep Informed' (Verzuh, 2005). These are usually presented in a matrix or graph.



(Source: EDGE Learning Media (Pty) Ltd, 2020)

Figure 5.12: Assessing the four components of stakeholder management



EXERCISE 5C

- Identify whether the following statement is true or false. Substantiate your answer.
Employees are considered stakeholders in a project.
- Discuss the role of stakeholders in the resolution of issues.
- In fewer than six sentences, discuss the importance of communicating the scope and requirements of a project with your stakeholders.

5.7 PROJECT MANAGEMENT IN PRACTICE

Moremogolo and his best friend, Nqobile, are software developers and want to start a mobile games development company. They manage to secure start-up funding from Standard Bank with the help of the small business advisor, Piet Lategan, as well as Moremogolo's uncle, Morgan, who owns a cell phone repair franchise called FixyPhones. Morgan has offered to let Moremogolo and his team work in one of his offices free of charge for as long as they like. It has all the necessary infrastructure, but none of the equipment.

Moremogolo and Nqobile wish to employ two more developers, an artist, a musician and an office administrator. Each of these team members will require a computer, worth about R 18 000. The musician should be able to supply their own musical instruments, as Moremogolo and Nqobile do not have the budget for this. The developer's monthly salary amounts to R 35 000, the artist and musician each make R 27 000 and the administrator is compensated with R 19 000 per month. In total, their company – MoNq Gaming – has secured R 3 million in funding for one year. Moremogolo and Nqobile have set aside R 250 000 for contingency funds.

Answer the following questions:

- (i) Construct a stakeholder register for each current (and potential) employee. You should include their name, role, organisation and category.
- (ii) Construct a value analysis of MoNq Gaming if after eight months they have completed R 1 900 000 of EV and R 2 050 100 of AC, against a PV of R 1 800 000. Then calculate the value of the terms in the left-hand column and write out the equation where it has not been given.

Terms	Equation	Value
EV	(given)	R 1 900 000
PV	(given)	R 1 800 000
AC	(given)	R 2 050 100
BAC	(The original R 3 million minus the contingency funds)	R 2 750 000
CPI		
SPI		
SV		
CV		
ETC		
EAC		

- (iii) Based on the analysis you have just completed, answer the following questions:
 - a. Is MoNq Gaming behind or ahead of their schedule? Substantiate your answer.
 - b. Is MoNq Gaming under or overbudget? Substantiate your answer.
- (iv) At the end of the first 12 months of MoNq Gaming's existence, it seems that they decided to vastly increase the scope of their project (based on a profit estimate), and are therefore closer to 35 per cent finished with the new project. They estimate that they would need another 18 months and another four staff members to achieve this.

Required:

In your own words, summarise what you would recommend their next steps should be. Your summary should begin at the present point and conclude with the initiation of phase two of the project. Your answer should not exceed 200 words.

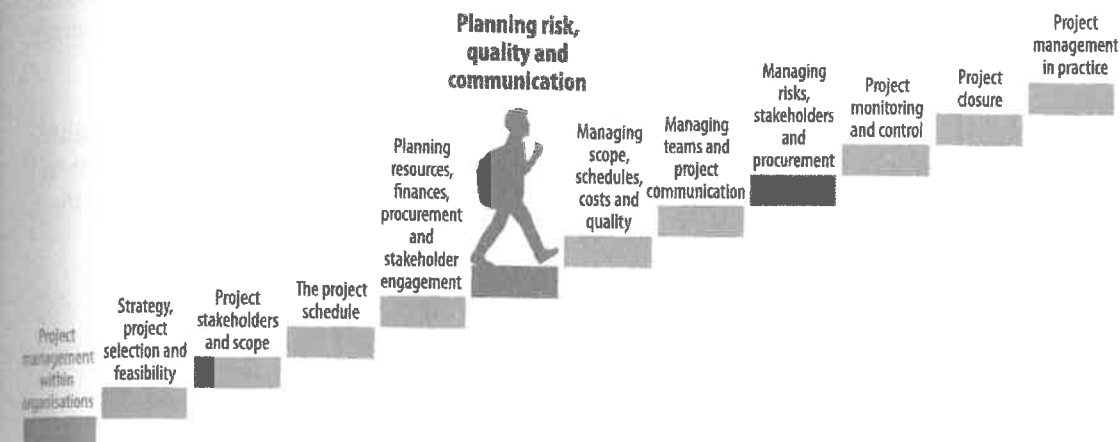
5.8 SUMMARY

Throughout this unit, we have learned of the various resources that a project manager will come to encounter during their career. We have learned how to develop estimates, resource breakdown schedules and resource assignment matrices, as well as how to compile these into a fully fledged resource management plan. Of course, our work does not end there. Once we have estimated and planned our resources, we need to know how much to pay for them, when to pay for them and where to get them. These are the questions that working through a budget and a procurement plan will help you answer. Not only that, but by using the techniques you have learned, you will also be able to control any delays, budget overruns or issues with the procurement pipeline that may arise during the project. Lastly, we discussed the importance of keeping your stakeholders involved throughout the planning process. It cannot be stressed enough how important proper, detailed and timely communication with your stakeholders can be. With these tools in hand, and not forgetting to regularly check and update your project documents, you should be well equipped to deal with any resource, budget or procurement opportunity that comes your way.

6

PLANNING RISK, QUALITY AND COMMUNICATION

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6.1 INTRODUCTION

Alice has dreamed of expanding her pottery business beyond her small community. However, she lacks the necessary funding to explore this opportunity. She was recently offered funding that would allow her to pursue this dream, so one of the funders asks her how she plans to ensure success in these new territories in the presence of competing businesses. Alice starts to stress, realising she does not have a concise answer to this question. The funder reassures her that her products are of the highest quality, but that a quality product does not guarantee the success of a business. They further explain that success must be planned for, and that by integrating risk, quality and communication plans into a project management plan, she can maximise her chances of success.

The primary goal for a project manager is to achieve the project objectives within a given set of constraints. These constraints, however, cannot be clearly and comprehensively known if they are not planned for. Project management largely comes down to planning, integrating and executing of plans, and three major aspects of a project that should be planned for are risk, quality and communication. In practice, this means that the project manager is responsible for developing the project objectives, and working together with the relevant stakeholders in order to develop all necessary protocols, procedures, policies and programmes that will allow the project to meet its goals (Kerzner, 2009: 876). Another major task that the project manager is responsible for during the planning phases is identifying, defining, assigning and communicating all tasks that are necessary to complete the project. If a team member, team leader or project stakeholder understands what they need to do, then they can plan and prepare accordingly. However, if the tasks are not properly defined or communicated in advance, then the project members will need to spend valuable time learning and planning *during* the execution phase of the project (Galbraith, 1974). If a task has more uncertainty involved, then the organisation will need to gather

much more information both before and during the project's execution. Consequently, resources may need to be reallocated or new schedules assigned, which can have a negative impact on the project budget, schedule and morale (Galbraith, 1974).

This unit will introduce aspects of project planning, such as risk, communication and quality planning, and provide a structured approach to creating the respective plans, along with the tools, techniques and methodologies that can be used in establishing and monitoring these plans.

After studying this unit, you should be able to:

- discuss the role and importance of risk planning;
- produce a risk management plan;
- detail various quality standards, requirements and metrics;
- create a quality management plan;
- outline important considerations when conceptualising a project communication plan;
- compose a project communication plan;
- discuss the risks associated with ineffective project planning;
- conduct a kick-off meeting;
- explain the process of reviewing the project planning phase; and
- apply your knowledge of project planning processes to both fictional and real-life cases and scenarios.

6.2 KEY TERMS AND DEFINITIONS

The following key terms and definitions are applicable to this unit:

- *Acceptance sampling*: A quality control technique whereby statistical sampling is used to determine whether to accept or reject a batch of products, based on the quality standards of the representative sample.
- *Acquisition*: Acquisition functions relate to the processes of obtaining the human and material resources necessary to perform project activities, and can thus be regarded as a project cost.
- *Business case*: An evaluation of the benefits, costs and risks of project options with a rationale for the preferred solution, providing a justification for undertaking the project by demonstrating the potential value of the project outcomes.
- *Deliverable*: The physical (or intellectual) product or service that the project aims to deliver for the project sponsors. Project deliverables are not limited to being tangible products, such as milk cartons or new automobiles; they can also be research insights or the renovation of an office.
- *Risk*: An uncertain event or condition that would likely have a negative effect on the objectives of a project. Each risk comprises three components, being the probability of occurrence, risk impact and duration of effect.
- *Six Sigma*: A set of quality management techniques and tools used to improve project performance and reduce defects in project deliverables. The 'sigma' refers to the statistical

approach of this method, which aims to reduce defects and delays to within six standard deviations (a statistical measure of difference) from the mean (average) (Kerzner, 2009: 913).

- *Stakeholder*: Any person or organisation that has some stake in the success of the project. In other words, these people or groups will be affected by the project in some way.
- *Total Quality Management (TQM)*: A holistic approach to management that requires every team member to aspire to the highest quality standards. The TQM approach is used by a manager who wishes to build lasting relationships with their clients by guaranteeing quality and satisfaction at every turn (ASQ 1, n.d.).
- *Work breakdown structure (WBS)*: A hierarchical tree-like structure that breaks down the scope of the project into smaller, manageable tasks, so that roles and responsibilities can be assigned to members of the project team.

6.3 RISK PLANNING

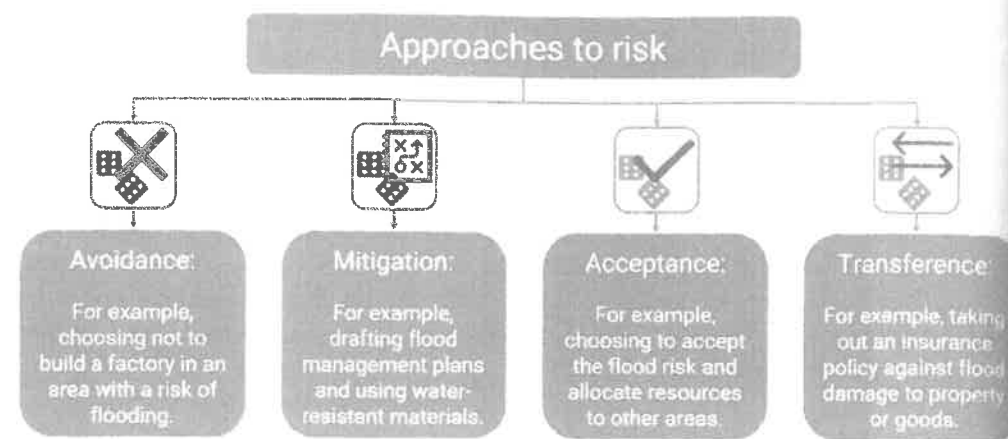
Every project will be exposed to unexpected events and conditions that can occur, known as risks. Risks can therefore be seen as a quantification (measure) of uncertainty. These risks can be a threat to the objectives of a project, and thus control measures should be implemented to limit the harm these risks can cause. Planning for risk management provides a means for uncertainty, or risk, to be systematically managed to increase the probability of meeting project objectives. Risk planning involves the construction of a detailed action plan for the management of risk. This requires the integration of risk management tools, such as a risk management plan and sufficient risk management training of members of the project team.

6.3.1 The role and importance of risk planning

No matter how carefully planned a project may be, it will always be vulnerable to risks. Risks are unpredictable, but they can be prepared for. Team members can become ill or quit, machinery can break down, and suppliers can miss their stated deadlines, but planning for these risks can lessen the effects and sometimes even prevent any negative effects.

Risk planning can be used to identify potential risks to the project, analyse how likely they are to occur, and make the relevant preparations to avoid or mitigate these risks. *Avoiding* the occurrence of risk is the best-case scenario. However, avoidance is often impossible, and *mitigating* the effects of the risk is the next best alternative.

What can we do if a risk cannot be avoided or mitigated? Sometimes, *accepting* the occurrence of a risk is the most constructive thing we can do in such an event, and time would be better spent assessing the details of the risk and improving the risk response for future occurrences. Also, some risks cannot be dealt with by the project team, but that does not mean we have to accept the occurrence of these types of risks. Instead, we can *transfer* the liability of these risks to a third party. The most common way that this is done is by purchasing insurance. Insurance companies can cover a wide array of risks to the project, such as theft, fire, equipment failure or even disaster. These four approaches are summarised in the following figure, using flooding as an example risk.



(Source: EDGE Learning Media (Pty) Ltd, 2020)

Figure 6.1: Approaches to risk in risk planning

To ensure that success is as likely as possible, it is critical to conduct risk planning. However, this should not only be done before the project begins; rather, it should be an ongoing process. To do this effectively, documentation of all details relating to risk planning will be necessary. The risk management plan is an effective tool that can be used to document how risks are assessed, as well as the protocols pertaining to risk planning.

Ultimately, a risk management plan will promote more consistent and efficient operations through the presence of contingency plans. A smoothly-run operation will often translate into improvements in customer satisfaction, as well as improved profitability in the long term.

6.3.2 Composing the risk management plan

Developing a proper risk-management strategy is crucial to the project's success. Planning for any unforeseen hindrances (or opportunities) is one of the project manager's most important tasks (Project Management Institute, 2017). The risk management strategies of the project rely heavily on the initial risk management plan. This is a document that describes how risks will be identified, and then managed. This requires the development and documentation of a comprehensive risk management strategy, accompanied by a methodology that can be used to execute the strategies outlined in the risk management plan. It is also important that adequate resources are set aside in the event of risk occurrence. Risk planning is an iterative process and requires regular efforts to identify, analyse, monitor and respond to risks. When composing a risk management plan, initial activities should be to define the following aspects (Project Management Institute, 2017: 404):

- **Purpose and scope:** This requires a clear and unambiguous definition of what the risk management plan hopes to achieve, as well as what falls under the authority or responsibility of the risk management plan and the associated team members.

- **Methods:** If a risk occurs, the responsible team members must know which tools and strategies are at their disposal to minimise or eliminate the risk's impact.
- **Roles and responsibilities:** The project manager must assign roles and responsibilities for risk management to each team member. No individual team or team member should be responsible for *all* the risks. For example, in most organisations, different members will be responsible for preparing for and addressing fires, theft or equipment breakage.
- **Budget and schedule:** The project manager is responsible for answering the following questions in the risk management plan: How much of the budget is dedicated to the management of risks? When and how is it appropriate to use contingency or management reserves (money reserved for crises)? How often should the risk management team meet in order to assess and plan for the next risk management cycle?
- **Risk planning documents:** All the risk planning documents *must* be available to stakeholders. Additionally, the project manager must develop specific documents, such as the risk assessment matrix or the risk breakdown structure, and make them available to team members.
- **Stakeholder involvement:** Understanding the stakeholder's and sponsor's risk appetites, as well as their risk thresholds (the point where they dissociate from the project because it is too risky), is necessary if the project manager seeks to properly assess the impacts of risks. Consider the impact of an earthquake on a construction project; delaying, scrapping and even redoing some work would be necessary. Now, consider how much worse it would be if the project sponsor decided to withdraw their funding or the architect left for another, safer project. Stakeholders with large risk appetites are less likely to leave a project during times of stress.
- **Control and communication:** The project manager defines all necessary communication channels (who, what, when and how). They also outline protocols for the timely monitoring, evaluation and control of the risk management strategies that they have designed.

This initial risk management plan will act as a guide, direction and outline for the project team to develop into a polished plan. Therefore, the initial risk management plan needs to provide the project team with an overview of all the relevant information they require to develop the risk management plan further (Kerzner, 2009: 754). Often, this information may be found in pre-existing project documents such as the project scope, resource assignments, and work breakdown schedules, among others. However, the project manager and their team may also want to do their own research, and compile this research based on various environmental or organisational factors, such as existing policy, regulation, market trends, or even the environment *itself* – e.g. earthquakes, heatwaves or criminality (Project Management Institute, 2017: 404).

Since the risk management plan is a guide, or roadmap, some aspects may be more specific than others (Kerzner, 2009: 754). This depends on both the nature of the project and the business environment, as well as the nature of the risk. Generally, the *more likely* a risk is, the *more specific* the plan can be when it comes to mediating the risk. For example, in an area that is at high risk for criminality, the risk plan will offer detailed instructions on how to reduce both the chances of the risk becoming a reality, and the impact of the risk, should it occur. However, for less certain risks, a more general approach can be advantageous, since it allows team members *greater flexibility* and independence in their risk assessment duties (Project Management Institute, 2017: 406). Risk management training goes hand in hand with a good risk management plan (Kerzner, 2009: 754). Project personnel should receive risk management training tailored to their specific roles in the

project. For example, technical staff will have differing risk response protocols from decision-makers, so they will require training in different aspects of risk management (Project Management Institute, 2017: 404).

A risk management plan prepares the project team for incidental risk, but the results of risks that occur should not be recorded in the risk management plan. Risk results will not be static, so recording each one would require frequent updates to the plan. Therefore, it is best to include risk results in a separate document, such as a risk register. Let's look at how to create one.

6.3.3 Creating a risk register

If a risk management plan is the document describing the methods, processes and tools used to manage various risks, then the risk register can be seen as the live document arising from its implementation. A risk register is a risk management tool used to document the collection of identified risks, as well as further information relating to each risk (Project Management Institute, 2017: 417). There is no set rule for the content of a risk register, and depending on the size and complexity of the project, a risk register can contain limited or extensive risk information.

After completing the steps of risk identification, a risk register is compiled with any desired additional information. The following figure displays an example of a risk register for a coal-fired power station, with common fields that can be expected, including necessary details for a risk, a risk-rating system, risk owner, and mitigation and contingency actions.

ID	Date identified	Description	Trigger	Probability	Impact	Threat score	Owner	Mitigation	Contingency	Progress	Status
1	1 December 2019	Unexpected rain could wet coal reserves, making their use for generation impossible	Heavy or long-term rainfall	Medium	High	Orange	M. Ndlovu	Ensure measures are in place to provide dry coal in advance if heavy rain is forecast	Measures to accelerate drying of wet coal. Invest in alternative fuel sources for generators	2 December 2019: Mitigation action implemented 5 December 2019: Contingency actions implemented	Open

(Source: EDGE Learning Media (Pty) Ltd, 2020)

Figure 6.2: Example of how a risk register could be structured

The following items are some common fields that can be found in a risk register:

1. *Risk identifier:* A unique numerical identifier representing each respective risk.
2. *Risk description:* A brief text description of what the risk is, what would trigger the risk to occur and the effects of the risk occurring.
3. *Risk trigger:* The conditions required for the risk to occur.
4. *Probability:* An assessed likelihood of the risk occurring using a variety of methods, ranging from available data to common sense. Values assigned can be numerical, such as one to

five, or use percentage probability. A ranking system such as 'low/medium/high' can also be used.

5. *Impact:* Describes the magnitude (size or extent) of negative effects the risk will cause, should it occur. The magnitude is often determined via an impact assessment. The ranking system used to assign a value usually fits with the one chosen for probability.
6. *Score:* An overall value for the risk, which is found by multiplying or combining the probability and impact values of the risk. This value can aid in determining risk prioritisation.
7. *Owner:* The individual or group primarily accountable for the risk.
8. *Mitigation:* Measures that are taken to reduce the probability of the risk occurring.
9. *Contingent action:* Measures taken to limit the negative effects that would result if the risk occurred.
10. *Risk status:* Whether or not the risk is currently active. If a risk is active, then additional information, such as the progress of actions taken against the risk, can also be included.



EXERCISE 6A

- (i) A local tree nursery wants to expand their premises, but fears that the risk of fires in the forested area surrounding them could endanger their trees. State how this risk could be avoided, mitigated, transferred or accepted.
- (ii) List the core steps involved in the process of creating a risk management plan.
- (iii) Consider the following hypothetical scenario and answer the question that follows.

VaalChem, a fertiliser manufacturer, has one of their factories along the Vaal river near Deneyville. They transport their fertiliser countrywide using their own fleet of trucks and couriers. They are busy preparing for a renewed production cycle, which means they are reviewing their plans and management strategies.

Required:

Identify two theoretical risks and create a basic risk register, using common fields found in a risk register. Then, using this register, determine which of the two risks should be prioritised.

6.4 QUALITY PLANNING

Quality planning ensures that the objectives of a product, service or organisation are consistently met. Achieving a good plan requires the identification of relevant quality standards and requirements for the project and its deliverables, and then documenting how the project will comply with these standards and requirements. This will guide the project team, in order to ensure that quality requirements are continuously managed and verified.

Most people associate quality with the final product or service purchased by the consumer, but quality control processes are important in all stages of a project to achieve consistency. The quality

standards and requirements desired for each area of the project must be identified, allowing for the monitoring and validation of each step using a set of quality metrics, such as customer satisfaction, failure/defect rates and rating systems.

The best approach to achieving quality objectives is to create a quality management plan that documents the specifications required to meet quality standards at each step in the process, as well as an accompanying methodology for measuring the achievement of quality objectives.

6.4.1 Quality standards and requirements

Everyone has a different assessment of what 'quality' means, based on the features or aspects of a product or service they desire. However, when it comes to a project, quality is defined by the project sponsor or client. This means that this stakeholder defines a set of specific requirements that the final product or service must conform to in order to be considered a sufficient level of quality (Alby, n.d.). Of course, as much as the conversation around 'quality' is led by the project sponsor, it must involve all the relevant stakeholders, such as the project manager, team members, and regulatory authorities, among others. The reason for this is that what the sponsor may consider to be quality may not always conform to regulatory or legal requirements; or it may not be achievable with the designated budget or schedule.

Quality requirements are categorised according to which of the following two categories they fall under (Project Management Institute, 2017: 112):

1. *Functional*: Requirements that are necessary for the functioning of the product or service. For example, when designing software, the functional requirements may be that it calculates the number of new stars being formed every year.
2. *Non-functional*: Requirements that are either cosmetic (the look and feel) or secondary to the function of the product. For example, the non-functional requirements of a software product may be that it has a user-friendly interface, that it performs these calculations in a reasonable amount of time, or that it does not crash frequently.

It is important to remember that a functional product can still be frustrating or unpleasant to use. For example, compare unflavoured two-minute noodles with a homemade noodle stir fry – both are food that will functionally satisfy your hunger, but the first option is probably not going to be a tasty meal (i.e. it will not fulfil the non-functional requirement of good flavour).

Standards are sets of rules, characteristics, protocols or guidelines that the activities or deliverables of a project should adhere to, in order to conform to local or international requirements (Project Management Institute, 2017). Safety standards in modern cars and quality standards in food are just two examples of these guidelines. In cases like these, you can see that standards are defined by a particular authority (such as the European Union or the ISO – International Standards Organization), and are given power because many people *consent* (agree) to their usage (Project Management Institute, 2017). When project stakeholders outline what they require from a project, they set a range of quality standards for the project members to follow. These standards are used to define *all* aspects of the project – from protocols, to deliverables, and even the performance

of management itself. If a project area adheres to standards, then it is classified as 'good practice'. Lastly, standards also define the relationship between the project and the organisation. This is to ensure that the project and its management adhere to organisational standards, as well as to further the organisational strategy.

Quality standards generally comprise the following components (Project Management Institute, 2017: 112):

- *Customer satisfaction*: In order to maintain acceptable quality standards, the project manager needs to engage with the project clients, customers and sponsors continuously to understand their needs and positions. This feedback loop between manager and client ensures that both parties are aware of what the project can and should deliver. Customer satisfaction should be maintained throughout the life cycle of a project, by ensuring the feedback loop aligns with the customers' expectations of what the project can deliver.
- *Continual improvement*: The foundation of continual quality improvement involves strategies such as the 'plan-do-check-act' (PDCA) cycle, and quality improvement initiatives, such as total quality management (TQM), as well as the Six Sigma and Lean Six Sigma methods.
- *Management responsibility*: In order for a project to succeed, everyone on the project team needs to work together and have the available resources needed to complete their tasks. Management is responsible for the provision of resources, leadership and planning, so that the rest of their team can perform their duties as efficiently as possible.
- *Mutually beneficial partnership with suppliers*: A project depends on its suppliers and vice versa. Building a mutually beneficial relationship with suppliers, which allows for cooperation and collaboration, can create value for both parties. This creates sustainable and long-term partnerships, rather than focusing only on short-term gains. Close relationships with suppliers allow for more agile responses by both parties to the needs and wants of clients and customers, as well as more efficient use of resources. Relationships based on partnership and cooperation with the supplier are more beneficial to both parties.

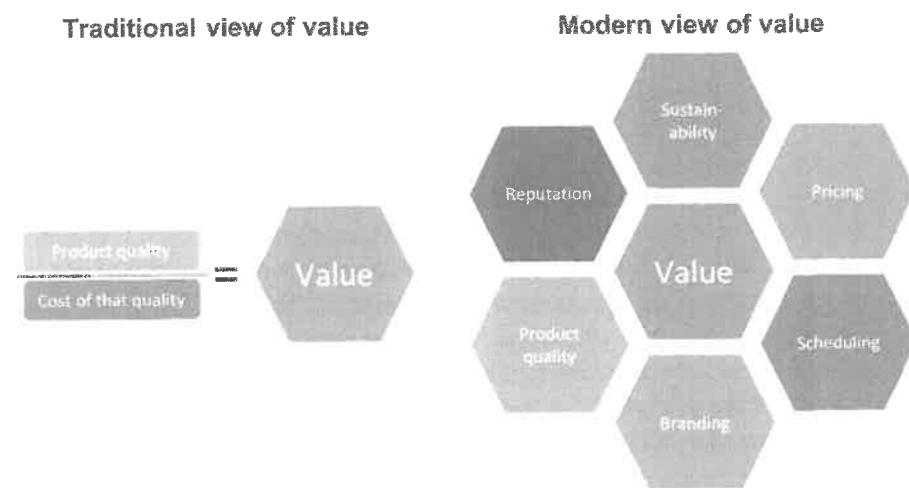
A good example of quality standards is the ISO 9000, which is a group of periodically updated, international standards that define good quality or good practices across a variety of disciplines and organisations (ASQ 2, n.d.). The existence of the ISO and its group of standards serves a dual purpose. Firstly, they assure any potential client or sponsor that the methods used in a project conform to stringent, internationally accepted standards. Secondly, they simplify project management, as the manager can easily adopt the relevant standards without having to develop new ones for their project. (ASQ 2, n.d.).

6.4.2 Quality metrics

Project metrics are important tools that are used to keep all stakeholders informed on the status of the project. Think about what a project manager values in a project's outcome, compared to a client or customer. Traditional project managers tend to see a quality project as one that is profitable for their company, which they measure according to how much money was generated compared to how much was spent (Kerzner, 2011: 151). However, customers will focus much more on the *quality* characteristics of the deliverable – i.e. does it *meet* their expectations and

needs, and does it go a step above those needs? Often, this results in the two perceptions being at odds with one another, because top quality materials, careful quality assurance and added features will all increase costs, for example, and may have been overlooked by traditional project managers focusing only on 'the bottom line' (whether the project resulted in a profit or a loss).

Because of this conflict in perspectives, the modern project manager understands that, in order to deliver value to their organisation and their clients, they need to integrate the customer's expectations of quality into what are known as *value metrics* (Kerzner, 2011: 151). These are quantifiable measures of areas that create value in a project. The traditional interpretation of value was to divide the final quality of the product by the cost necessary to obtain this quality. However, more recent interpretations suggest that quality is but *one of* metrics that can be used to assess the value of a project. Modern interpretations include many metrics such as those included in the following figure, and many others (Kerzner, 2011: 151). A good project manager knows to adapt their value criteria for the project and client at hand (Kerzner, 2011: 152).



(Source: EDGE Learning Media (Pty) Ltd, 2019; adapted from Kerzner, 2011: 151)

Figure 6.3: The difference between the traditional view of value and the modern view (holistically based on numerous factors)

Quality metrics can vary depending on the project technologies and methodologies used by the team. Some of the most commonly used quality metrics include factors such as how often defects occur, whether products or processes fail, and scheduling or budgeting overruns (Alby n.d.). Together, these metrics can be referred to as the cost of quality, and these costs of quality can be classified as conformance costs and non-conformance costs (Kerzner, 2009: 890). Conformance costs are costs that arise from creating the project and ensuring it conforms to (meets) any quality standards and requirements for all its deliverables. Examples are buying necessary equipment and materials, maintaining or calibrating any tools or machines, training employees, and doing quality assurance audits to check that all deliverables meet requirements. In contrast, non-conformance costs are those that come from deliverables that do not conform to or meet quality requirements.

In other words, when a product is rejected by a customer and it needs to be disposed of, remade or repaired, or if an entire batch needs to be recalled or the product redesigned, the costs incurred are non-conformance costs.

These two kinds of quality costs can be further classified according to the following four categories (Kerzner, 2009: 890):

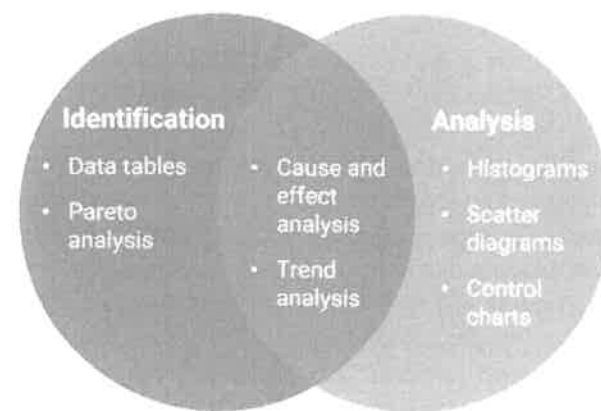
1. **Prevention costs:** Costs associated with ensuring that like deliverables satisfy the customer's quality requirements the first time, without defects or failure. These include costs such as design review, training, quality planning, analysing project processes and surveying all project stakeholders. These, therefore, fall under conformance costs.
2. **Appraisal costs:** Costs associated with the internal evaluation of processes in the project pipeline, and whether these lead to a deliverable that satisfies the expectations of the customer. These costs are associated with various quality assurance procedures that evaluate the process, protocol, product, design or vendor being used by a project. These are all conformance costs.
3. **Internal failure costs:** Costs resulting from failure to produce a deliverable that meets the quality expectations of the consumer before it leaves the control of the organisation. These costs stem from various corrective measures, such as repairing, reworking, redesigning or even scrapping the entire product or process. Other costs can come from wasted time and resources, or from paying for evaluations and controls. These are non-conformance costs.
4. **External failure costs:** Costs that come into play when the deliverable received by the customer does not meet their requirements. Any cost associated with a customer's complaints, product returns or refunds, as well as costs relating to the inspecting and evaluating of defective products or services, are external failure costs. These costs will also include those stemming from any corrective action the organisation or manager decides to undertake. These are all non-conformance costs.

Non-conformance costs should be avoided where possible, and using a set of completion criteria can assist in keeping these costs low. Primarily, completion criteria will aid in improving product quality, and will also allow for a deeper understanding of the production tasks and processes involved. This will result in more accurate estimates and a better probability of success. Two important questions every project manager should ask themselves early in the product development phase are: 'What determines whether the production task was successfully completed?', and 'How do we know whether it was completed correctly?'. Testing each business case is of the utmost importance, and the necessary completion criteria can be determined by researching the respective industry best practices. Examples of completion criteria include the following methods:

- **Peer reviews or 'walk-throughs':** These are very common in the early stages of a product development life cycle, when there is not yet anything tangible to test. These reviews yield more internal opinions on the business case in the planning phase, and often lead to a more cost-effective construction phase for product development.
- **Checklists:** Lists of quality metrics and customer requirements can be used to determine whether a product 'ticks all the right boxes' and can be considered acceptable.
- **Rigorous systematic testing:** Tests can be conducted in the later stages of the product life cycle, to identify any product vulnerabilities or weaknesses that may need to be addressed.

As technology has improved in recent years, automated systems have allowed project managers to collect, process and analyse large datasets by using statistical tools. This has had an impact on the core philosophy of decision-making in business. Using hard data and statistics mitigates against the subjectivity – or bias – of key decision-makers, as business leaders and project managers use these quantifiable metrics to approach decisions (Kerzner, 2013: 893). Statistics also enable better communication, as discussions are based around facts, with a higher likelihood of reaching a consensus for action when supported by these facts.

When approaching a project, all processes or procedures that make up an activity will have a way to measure their success or completion, and a measure to track any failures or mistakes (Kerzner, 2013: 893). Measuring success often uses a percentage-based system, while failures or faults often use statistical measures of variance or standard deviation (the range of difference from the average). Statistical process control takes advantage of these natural characteristics. The project manager uses these forms of statistical information in order to make decisions in the best interests of the project and related processes. For example, using information about high variance in product quality, focusing on a particular process, could be done to evaluate whether a more reliable, but more expensive, alternative is worthwhile. In turn, these decisions generate newer statistical information that the manager will take into account for the next production cycle. This feedback loop of statistical information and decision-making is essential for the reduction of errors and improvement of project processes (Kerzner, 2013: 893). Statistical tools can assist in this feedback by performing two functions: identification and analysis. The following figure shows seven of the statistical tools that are used in quality management metrics, and where the two broad types of tools intersect.



(Source: EDGE Learning Media (Pty) Ltd, 2020; adapted from Kerzner, 2017: 710)

Figure 6.4: Statistical tools commonly used in the identification and analysis processes

Data tables and histograms

The modern manager will often be required to understand and work with vast quantities of data. Of course, raw data is usually an unedited jumble of numbers, which no human can understand – let alone base decisions on. The first step in making data understandable is to present it in a readable

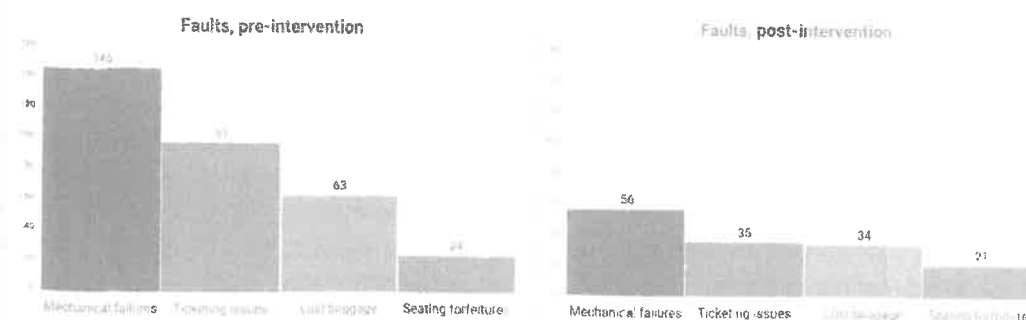
data table format. This means arranging the data according to meaningful categories and sorting it along rows and columns that describe those categories. If the data relates to the frequency of certain events, like deliveries, mistakes, production cycles, then it can be more clearly displayed as a histogram. Histograms are specialised charts that can give the manager an indication of the frequency with which certain events occur. They provide a quick overview of how the data is distributed and whether there are any concerns with certain events – histograms are, therefore, used for analysis.

Pareto analysis

Pareto charts specialise in showing data that is specific to fault-finding (Kerzner, 2013: 898). They rank defects or faults of the project according to the frequency with which they occur. Pareto charts identify significant deviations from the norm in the data and then rank – or *weight* – them according to frequency and importance. In quality control, these elements would be those accounting for most quality problems in a system. There are three types of Pareto analysis, each with one of the following distinct functions (Kerzner, 2013: 898):

1. **Basic:** Focuses only on the largest contributors to the quality of the project sphere, as given by the available data.
2. **Comparative:** Selects a mix of factors, which are then evaluated together in order to determine the best course of action.
3. **Weighted:** Applies specific ranking to each variable under consideration, which marks its impact, importance or risk factor for the project.

The following figure displays the use of a comparative Pareto analysis for common defects that occur in the production line for an organisation. The first graph shows the defects in descending order of frequency, allowing the identification of the most frequently occurring defects in order to help determine the level of priority for corrective action. The second graph shows the frequency for the common defects after a corrective strategy was implemented. Capacitors were identified as the most frequently occurring defect, and the corrective action was able to reduce the frequency from 65 per cent to just 25 per cent.



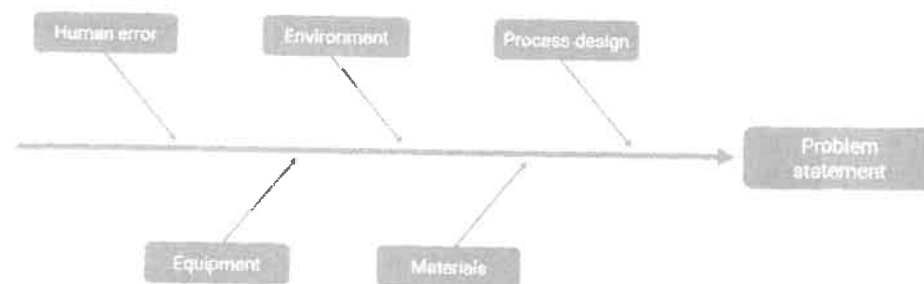
(Source: EDGE Learning Media (Pty) Ltd, 2020)

Figure 6.5: Pareto chart of the frequency of faults that lead to delayed flights, before and after process interventions by management

Cause-and-effect analysis

After identifying a problem, it is important to determine the cause. The cause-and-effect relationship can be obscure at times, and a considerable amount of analysis may be required to determine causes or contributing factors. Risks identified using statistical tools, such as the Pareto analysis and control charts, can be analysed using techniques such as cause-and-effect analysis (Kerzner, 2013: 895). Cause-and-effect analysis uses diagramming techniques, such as fishbone diagrams, to identify the relationship between an effect and its causes. An interdisciplinary brainstorming team is assembled based on the technical, analytical and management knowledge required to determine the causes of the problem (Kerzner, 2013: 895). The major categories that can contribute to a problem are then identified, and their potential causes are analysed. Once a consensus is reached on the causes, a corrective action is determined for implementation.

A fishbone diagram is constructed by first drawing a problem box containing the problem statement, which in this case would be the identified risk, and a main, horizontal arrow leading to the problem box. The potential causes for the risk are then organised according to common categories, such as equipment, human error, environment, process design and materials, and cause boxes are drawn for each of the relevant categories included, with arrows connecting the cause boxes to the main arrow; as shown in the following figure.



(Source: EDGE Learning Media (Pty) Ltd, 2020)

Figure 6.6: Generic structure for a fishbone diagram used in cause-and-effect analysis

After constructing the fishbone diagram, there are three methods that can be used to analyse the potential causes contributing to the identified risk (Kerzner, 2013: 896). The *random method* involves listing all the causes for each cause box category, and analysing them all simultaneously. In contrast, the *systematic method* focuses on analysing the list of causes for one cause box at a time, in descending order of priority. Finally, the *process analysis method* ranks the cause analyses in order of the project processes. This usually means that the main arrow is modified by inserting process chain boxes, and the cause boxes are analysed for each step in the process chain.

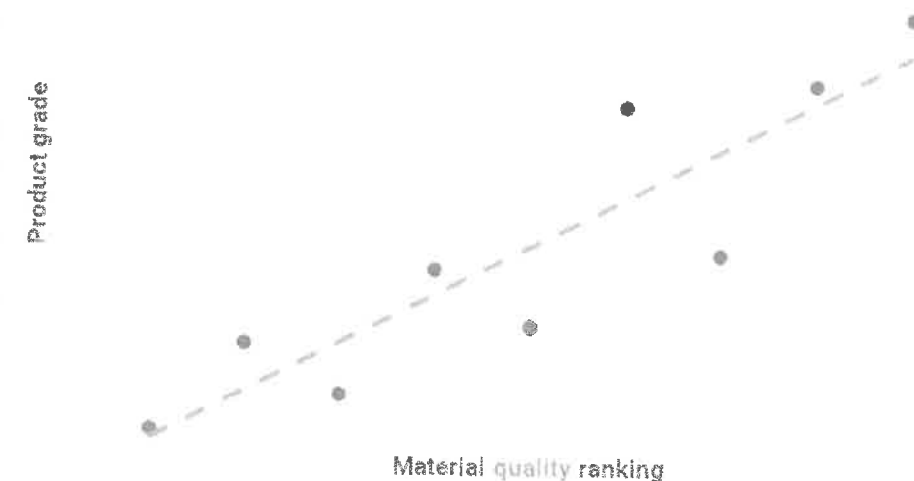
Trend analysis and scatter diagrams

Trend analyses are methods of projecting or estimating the future performance of a variable, such as product quality or resource costs, based on current data (Kerzner, 2017: 901). The data

is presented in a scatter plot, as shown in the following figure, and a computer programme derives an equation that best explains the data; this is known as a trend line, or line of best fit. The steepness, or gradient, of the line indicates by how much the dependent variable (on the vertical axis) changes in relation to changes in the independent variable (on the horizontal axis).

The graph in the following figure suggests that a higher quality material will lead to a better product grade overall. For example, if the gradient of the line was two, this would mean that each time the horizontal axis shifts to the right by one unit, the vertical axis shifts by two units. To illustrate this further, think of mileage in a car. The distance you can drive depends on how much petrol you have, so if a car has a mileage of 10 km/l, this means that every litre allows the car to drive 10 km. Therefore, if you know how much petrol you have, you can predict how far you can drive. Similarly, managers and organisations can forecast certain aspects of their projects based on their resources (Kerzner, 2017: 901).

Impact of material quality on product grade



(Source: EDGE Learning Media (Pty) Ltd, 2020)

Figure 6.7: Impact of material quality on the grading of the final product

The graph in the figure is an example of a trend analysis. In this case, you can see that a higher quality of material (indicated by values further to the right on the graph), will result in a better grading for your product (indicated by values higher up on the graph). The line that attempts to connect these data points is the trend line. Not all the data points sit perfectly on this trend line, but you can see that they generally follow the shape of the line. From this, you can extrapolate that if the material quality were to increase even further, the product grade would also increase. Consider how the quality of any final product – e.g. food, clothing or technology – depends

on the quality of the initial materials. Even services depend on the quality of the materials, but in this case, the materials would be the project staff. The quality of their education, training, leadership, motivation and character all influence the quality of the service they will render. Trend analyses based on scatter plots are an incredibly important tool in the professional world, because they allow businesses to know how their dependent variables (e.g. product grade, profits, risks, quality etc.) react to the independent variables (e.g. material quality, planning, investment etc.). Another way to view these graphs is to think of them as showing you the relationship between factors that you *can* control and factors you *cannot*. You can control the material quality at the beginning of a production cycle, but you cannot control the product grade before controlling material quality.

Control charts

Fixing a problem, such as recalling defective products, can be more costly and harmful to a company than ensuring these defects never happen. Control charts are a tool that can identify where processes are likely to create problems, as well as analyse how to better calibrate the process in order to avoid problems, rather than having to discard defective results (Kerzner, 2009: 901). These charts use statistical analysis to achieve this, and there are many different types of control charts, each with specific uses and functions. Going through each of these is beyond our scope for this unit, so let's begin by looking at the statistical assumptions of control charts and their common features.

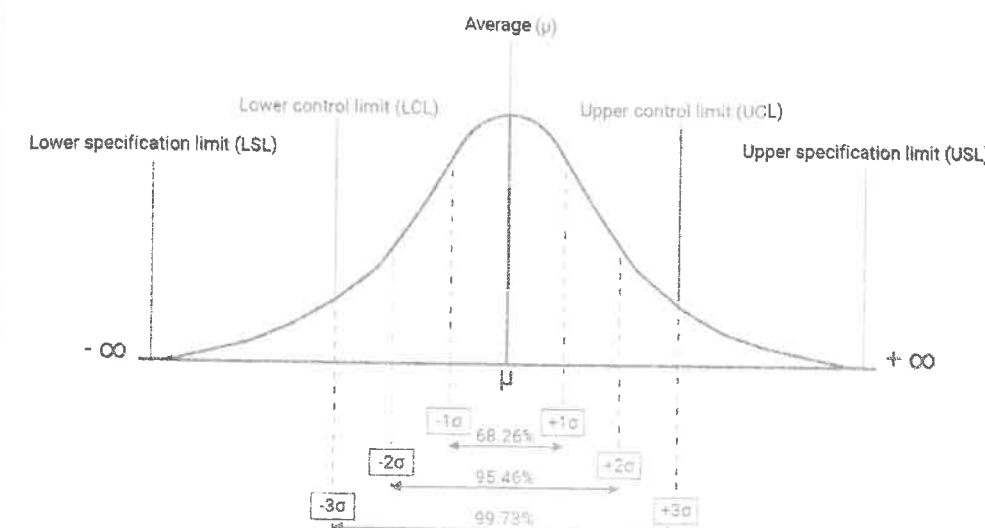
Imagine a company that creates batteries. Their average battery should last for 20 hours, which means that if its manufacturing process is functional, then 20 hours should be the mean (or average). Of course, some of the batteries may have more capacity, while others may have less, due to defects or variances in manufacturing. Some may last for 23 hours, while others could die after only 15 hours. If you bought a 20 hour battery, would you be happy with it failing after fewer hours? Perhaps if it was close, say over 19 hours or under 21 hours, you may not even notice. Using what the customer and manufacturer can tolerate as variance from the ideal average of a 20 hour battery life, the company can set tolerance limits above and below this mean, so that anything outside of those limits would be considered defective. Control charts can be used to identify how many of the products fall outside of these specifications, to control and improve the process.

All control charts, therefore, need to include certain features. Moving outward from the centre of the chart, these features include the following (Kerzner, 2009: 906):

- **Mean or average line:** This is the centre line of the chart and is usually a solid line showing the average of the data. The mean is often indicated on a chart with the mathematical symbol ' μ '.
- **Upper and lower control limits (UCL and LCL):** The UCL and LCL lines are based on a statistical measure called the standard deviation (or sigma). The UCL and LCL are usually at three 'sigmas' above or below the mean – we will return to this shortly. Standard deviation is typically indicated on the chart with the mathematical symbol ' σ ', and a positive or negative value to show how far it is from the mean.
- **Upper and lower specification limits (USL and LSL):** These limits are based on the requirements that the output must meet, so any output that falls beyond the upper or lower limit is defective.

These features come from what is called the 'normal statistical distribution', also known as the 'bell curve' because of its shape (Kerzner, 2009: 902). The following figure illustrates what this normal distribution could look like.

Control limits and standard deviation



(Source: EDGE Learning Media (Pty) Ltd, 2020)

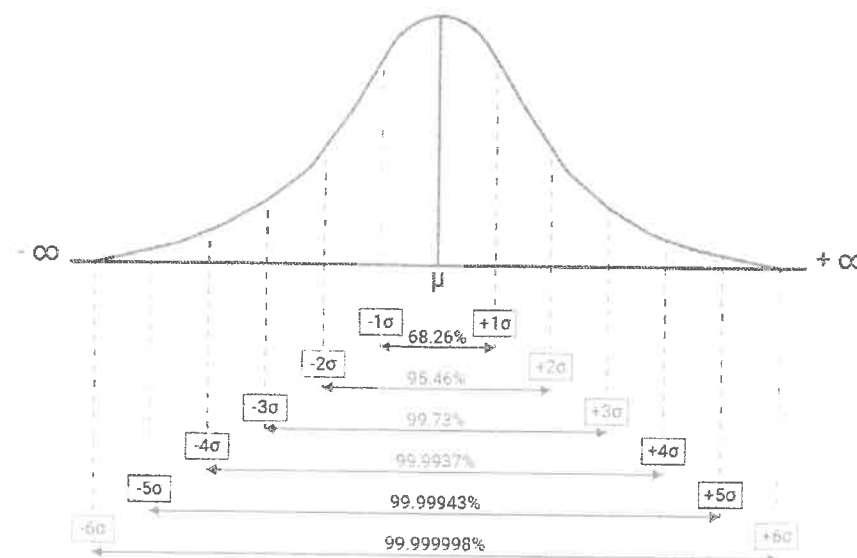
Figure 6.8: A normal distribution showing the mean line, the upper and lower control limits and the upper and lower specification limits

As you can see, the middle line is the average, and the normal distribution assumes that the majority of outputs will fall close to this line. The standard deviation, marked by the Greek letter sigma (σ), is a measure of how far from the average different proportions of the data lie. In a normal distribution, just over 68 per cent of outputs fall inside the first sigma on either side of the average. At three standard deviations, 99.73 per cent of outputs are covered. Therefore, if a company sets their specification limits at three sigmas above and below their desired output, then that means that 99.73 per cent of their outputs will conform to requirements. To improve on this, most companies will put their control limits at the three sigma points, so that 99.73 per cent of outputs are within control limits, and even more are within specification (Kerzner, 2009: 902). You can see this in the diagram. If a company is aiming for this three-sigma approach, then their process needs to be fine-tuned, because for every 10 000 units produced, only 27 may be defective for the production process to be considered satisfactory (Kerzner, 2009: 902).

Some companies are even more stringent, and place their control limits at six sigmas on either side of the mean. This is the core of 'Six Sigma' methodology, which is used to develop a process so carefully calibrated that it produces only two defects for every billion outputs (Kerzner, 2009: 902). The diagram to follow shows you where each sigma sits on the normal distribution. Compare how

much of the curve is above zero beyond the three-sigma mark to how much is above the curve beyond the six-sigma mark. As you can see, if the control limits are set at the six-sigma mark, even more of the output needs to conform, and the line showing the frequency of defects is so close to zero that it is barely noticeable.

Six-sigma deviation



(Source: EDGE Learning Media (Pty) Ltd, 2020)

Figure 6.9: Example of six-sigma deviation

This type of deviation can, of course, save on costs from defective processes, but it is very costly to implement. To achieve it, processes need to be studied, evaluated and innovated. Six Sigma methodology uses the DMAIC process to achieve this, which stands for (Kerzner, 2009: 914; Taylor n.d.):

- *define* (create a definition of the problem or chance for a defect to occur);
- *measure* (determine the performance baseline of the process or project in place, or from historical data);
- *analyse* (use the data, such as what would be presented in a control chart, to identify areas where performance is unsatisfactory);
- *improve* (standardise, redesign, simplify or streamline the process based on this analysis); and
- *control* (implement the improvements and make them permanent).

When using control charts to improve a process to three- or six-sigma control limits, it is important to understand that there are two types of variance, which these charts help to identify (Kerzner, 2009: 903–904). The first is *common cause variability*, which is the result of the expected

randomness inherent to any process. If control charts show very high variability in a process, then it is necessary for management decisions to sign off on a total change to the process itself. The second type, *special cause variability*, is the result of unexpected or extreme factors, which need to be investigated and understood. These could be due to machine wear and tear, or human error, for example. The control chart will show a point beyond the control limit, or a trend that draws very close to it (Kerzner, 2009: 904). Using control charts can, therefore, help to identify when an entire process needs to be redesigned, or when some other factor has caused a defect. While they do not necessarily identify what that factor is, they do provide clues that an experienced or trained project manager can use to find the source of the variance (Kerzner, 2009: 906).

6.4.3 Composing the quality management plan

Broadly speaking, a quality management plan defines the level of quality that is accepted by the customer, and describes how the project will achieve these quality metrics at each stage of the process. Successful quality management will ensure that products are built to the agreed quality standards and requirements, work processes are performed efficiently and as documented, and non-conformances that are identified receive the appropriate corrective actions (Kerzner, 2009).

The foundation of any good quality management plan starts with a quality policy. This is a document that affirms upper management's commitment to upholding the quality requirements or standards of a project (Kerzner, 2009: 887). This document also outlines the scope, purpose and objectives of the quality plan, and relies on input from stakeholders with relevant expertise to compile these outlines. Good quality management begins with good management; upper management must stress and support the quality policy, as much as they expect middle and lower management to implement the quality plan (Kerzner, 2009: 887). The quality policy is vital in nurturing the reputation of quality for an organisation, and must be implemented from the top management all the way down to each individual employee, in order for the quality standards to be sustained.

A well-designed quality policy defines the objectives, outcomes and principles by which management and team members ensure good quality deliverables, protocols and processes. Good quality policies also ensure that the team knows how the project will be viewed by the clients, sponsors or external stakeholders. This means that the quality objectives should clearly set out specific and attainable goals that have identifiable deadlines (Kerzner, 2009: 887). Objectives that are SMART (specific, measurable, attainable, relevant, and timely) help maintain morale among the project team and minimise frustration among external stakeholders.

Quality assurance

We have looked at how important it is that a project's *outcomes* meet predefined quality standards or requirements. *Quality assurance* is a set of processes and protocols that define the responsibilities of management, as well as team members, which result in a good quality project that meets all requirements (Kerzner, 2009: 888). The project manager is responsible for planning, managing, monitoring, evaluating and controlling the quality of the project deliverable. They achieve this by establishing methods and protocols for regular, thorough testing of the project deliverables and/or evaluation of key aspects of the project, including the performance and well-being of

team members. This has a twofold purpose: firstly, the manager ensures that their deliverable meets the quality expectations and requirements of the client or sponsor. Secondly, the manager ensures that the project and deliverables meet legal, policy and regulatory requirements. Good quality assurance, therefore, is a holistic approach that includes not only the deliverables, but also the project stakeholders, the business or market environment, and the organisational processes, assets and strategies. In order to achieve this, the project manager must clearly define the goals, objectives, methods, protocols, requirements and performance metrics for quality assurance, and they must perform regular quality assurance assessments of the project and deliverables (Kerzner, 2009: 888).

Where quality assurance seeks to prevent potential problems with quality, the manager can use *quality control* activities to rectify faults in the project processes or deliverables. Quality control uses regular monitoring, evaluation and statistical methods in order to ensure conformity within the project (Kerzner, 2009: 888). A high degree of variability in the project indicates that some form of corrective action needs to be taken. Quality control, therefore, also includes specific, technical instructions for the manager or project members that they can follow in order to ensure conformity in the project and deliverables. A good quality control system needs to meet a number of requirements (Kerzner, 2009: 889). It should be specific in what is controlled, and should outline the set of standards that will provide the basis for decisions regarding corrective action. Measurement methods should be established to compare produced quality to the stated quality standards, and procedures should be put in place to bring non-conforming processes and deliverables back in line with quality standards. Measuring of instrumentation should also be regularly monitored and calibrated to ensure sampling data is reliable and accurate. Lastly, all processes should also be documented in detail.

When designing and implementing a project, poor judgement and lapses in quality are realistic threats that can arise. For this reason, quality audits are an important step in ensuring that quality standards are being met (Kerzner, 2013: 889). Having an independent party, whether internal or external, perform quality evaluations of the processes involved in the project will ensure that quality standards are upheld. This will guarantee that products are safe and fit for use, and that all laws and regulations are abided by. Data collection and distribution systems should be effective, so that corrective actions can be taken when required and improvement opportunities can be identified (Kerzner, 2013: 889).

Something that can help in the organisation of project processes is using a quality plan and a work breakdown structure (WBS), which are complementary documents (Kerzner, 2013: 889). The WBS indicates the smallest reasonable level a task can be broken down into – i.e. the 'core' tasks. On the other hand, the quality plan is designed to implement quality control and assurance protocols at the core level, in order to ensure that each subsequent task has inputs of the requirements to ensure its own quality. In this way, a quality plan will act as a roadmap to guarantee that deliverables meet the expectations of customers and stakeholders (Kerzner, 2013: 889). It is therefore, necessary that all external and internal customers are identified, and that the design of processes are tailored to produce the features they most desire, while also being responsive to changing customer needs. Quality checks should be put into place to ensure that all processes achieve the desired results, and that quality objectives are upheld.



EXERCISE 6B

- (i) In no more than three sentences, discuss which conditions help the project manager to identify if they have produced a quality deliverable.
- (ii) Identify the type of chart that would be best suited for the following data:
 - a. Projecting the future number of chocolate bars that a company can produce in a given production cycle, by examining the historic chocolate bar output of the company.
 - b. Determining which of the chocolate bars are most defective in order to implement changes to the processes, packaging or recipe, as well as monitoring the frequency of defective chocolate bars in response to these changes.
 - c. Setting control limits for how often defective chocolate bars can occur, and using the data of normal and defective chocolate bars to determine how variable the quality is and whether there is a fault somewhere in the production process.
- (iii) Consider the following case study and answer the question that follows.

In 2017 and 2018, there was an outbreak of a food-borne illness called listeriosis. This outbreak was one of the worst public health events in decades. It spanned most provinces and resulted in nearly 1 000 infections and 183 deaths. It took officials nearly a year to track down the cause of this outbreak. In early 2018, it was confirmed that the cause of this outbreak was an infected polony product from Enterprise Foods. The product was immediately recalled, and soon thereafter, the rate of new infections decreased drastically (World Health Organization, 2018).

Required:

In your own words, discuss three potential areas where the quality plan of Enterprise Foods may have failed during the 2017 to 2018 outbreak of listeriosis.

6.5 COMMUNICATION PLANNING

Communication is one of the most important aspects in project management, as it acts as a functional link between the other aspects of project management. Project management tasks involve setting and gaining agreement on project objectives, coordinating members of the project team and project stakeholders, identifying and solving issues, and managing expectations. Considering these key tasks, we can easily see how the majority of a project manager's duties will revolve around effective communication. For this reason, project managers will need to engage in communication planning throughout the project's life cycle.

The larger the number of project stakeholders, the more complex the communications channel matrix becomes. The following figure illustrates how we calculate the number of communication channels.

$$N = \frac{n \times (n - 1)}{2}$$

N is the number of communication channels, and n is the number of people.

$$N = \frac{8 \times (8 - 1)}{2}$$

If we have a project with eight people ($n = 8$) then there will be 28 communication channels in total. Compare that to a project with six people, which would have only 15 channels to manage.

$$N = 56 \div 2 = 28$$

(Source: EDGE Learning Media (Pty) Ltd, 2020; adapted from Project Management Institute, 2013: 318)

Figure 6.10: Formula for calculating the number of communications channels, with a worked example

Project managers can limit the complexity of the communications network by introducing a communications plan that will focus on getting the appropriate communication to the relevant stakeholders, and on reducing unnecessary communications / communication channels.

6.5.1 Communication plan considerations

A communication plan will document the primary strategies for getting the right information to the right people, at the right time. Before creating a communication plan, there are some key areas that should be considered if we are to produce a plan that promotes effective communication, which are discussed as follows (Verzuh, 2015: 341–343).

Identifying which stakeholders require information

The project manager should begin by answering the question of which stakeholders need to receive information. There are many stakeholders of a project who will require some information to be shared with them, and they may also be sources of information themselves. They include the sponsor of the project, managers in charge of resources and policy, the clients or customers, and the team who will work on the project (Verzuh, 2015: 341). As we will address in the next section, different stakeholders will also need different information that is relevant to them. The communication plan will, therefore, detail which information is allocated to whom, as well as how this is done.

Identifying which information should be communicated

Once the key stakeholders have been identified, the project manager will need to decide which information they are likely to need. Doing this involves categorising and labelling information, which organises the flow of information within the project. The following list provides the three main categories to use in this organisation (Verzuh, 2015: 342):

1. **Authorisations:** Pieces of information that require an approval, review and modification process, like project plans and budgets.
2. **Status changes:** Information such as reports on costs, progress on schedules or problem logs. Different audiences will require different reports and different levels of detail.
3. **Coordination:** Information like the project plan is critical in allowing stakeholders to work together, collaborate and build relationships. Coordination of information is also required

to ensure that work is efficient and approached correctly, especially if there are any changes to the project or stakeholders' situations.

When developing status reports and other methods of communication, it is also important to be aware of how much information needs to be communicated. It is common to think that all information should be covered in a status report, but this can be overwhelming and include details that are irrelevant to the audience (Verzuh, 2015: 342).

Determining when information is needed

When is information needed? While the answer to this depends on the type of information, the answer is often 'as soon as possible'. Decision-making requires readily available information, and so information should be shared timeously (Verzuh, 2015: 342–343). Waiting for information can cause delays, or decisions to be made without all the facts required to make an informed choice. So, it is important to gauge the way a stakeholder approaches frequent communications, and how long they take to respond, which can be a measure of their involvement in the project overall (Verzuh, 2015: 342–343). If a stakeholder does not respond swiftly when a response is required, then their commitment is questionable.

It is also important to consider which stakeholders will need the most communication, and which need to be contacted only infrequently. For example, the project manager should schedule frequent meetings with higher-level managers to keep them up to date with any developments, delays, risks or problems (Verzuh, 2015: 343). These meetings can be kept to short, face-to-face updates that ensure important stakeholders are aware of the situation if a problem does arise. Additionally, meetings with a wide range of stakeholders, or other forms of frequent communication, can be a source of new ideas or perspectives on the project. For this reason, you should consider how frequently communication should occur, in order to ensure communication is timely and clear without becoming a waste of time.

Finally, when considering timely communication, it is important to remember that a project manager may need to communicate with hundreds of stakeholders, and likewise, stakeholders may need to send or receive information from multiple sources. Establishing frequent, timely communication and acceptable response windows will allow the project manager and all members of the project team to make effective use of time as a resource, and not spend the majority of their time sending and receiving project updates.

Determining the methods and medium of communication

When planning communication, it is important to consider how it will take place (Verzuh, 2015: 343). In the digital age, we need to adapt to a wide range of evolving tools and software for communication. Communications technologies, such as the Internet or an organisation's intranet, enable almost instantaneous sharing of information (Verzuh, 2015: 343). These technologies also enable collaborative work on project documents. A shared project or activity schedule can be used by team members to update progress regularly – regardless of their location in the world. Such software or applications can prevent unnecessary email chains or meetings, by simplifying minor

communications. Other communication channels include meetings, conference calls, video calls, text messages, emails and many more. The project manager needs to decide on the appropriate communication channel for the information they wish to share, as well as for the stakeholder they wish to share it with. It may also be necessary to standardise communications by using uniform channels, like the same suite of tools or software (Verzuh, 2015: 343). Lastly, you should consider the communication limitations and requirements of all necessary parties. For example, the C-suite may not have the available time needed to arrange regular meetings – especially when a short email may suffice in updating stakeholders on the project status (Verzuh, 2015: 343).

6.5.2 Creating a communication plan

Now that we have looked at the focus areas for planning communication, we can examine how to create a communication plan. This essential document outlines how and when communication will occur, what information will be communicated, as well as which stakeholders will be communicated within different contexts and how often this will occur. Good communication plans also include the number and type of appropriate communication channels among project stakeholders, as well as protocols that monitor and evaluate this communication (Project Management Institute, 2017: 378). After evaluating the numerous considerations in the previous section, it is time to create an actionable plan that will be distributed to all relevant project stakeholders. Communication is an ongoing activity. The purpose, audience, message and channels may change, and the communication plan should adapt to reflect changes in the project environment. It is, therefore, important that communication strategies are continuously evaluated and adjusted when needed.

The ten-step communications plan

Fiona McEachran (2017), an experienced marketer and project manager, developed a ten-step process for building a communications plan. These are summarised as follows.

Step one is to clearly define the outcomes, objectives and goals of the communications plan. All of the relevant project stakeholders need to be aware of why the communication plan is being developed, as well as how it will aid their contributions to the project. Well-defined, clear and concise communication will improve morale, encourage synergy between teams, improve processes, and ultimately lead to a better deliverable (McEachran, 2017).

Step two is to define the audience of the communications plan (McEachran, 2017). The plan should include most, and sometimes all, of the project's internal and external stakeholders, and should define what information is required by each. Constructing a list of potential stakeholders, such as financiers, clients, sponsors, team members, vendors etc., and then grouping them according to their degree of perceived importance or authority, can help to clearly define which channels of communication suit each stakeholder, and what information they require (McEachran, 2017). For example, upper management would require only updates on the project status, whereas team members will require more detailed instructions, schedules or breakdown structures.

Step three is for the manager to determine what their 'key messages' are, because the objectives defined earlier can be achieved only if the manager knows these (McEachran, 2017). As we saw in the

previous section, there are different kinds of communication (authorisations, status updates and coordination), and these are relevant to different stakeholders (Verzuh, 2015: 342). Understanding the type of information your audience requires will allow you, as the project manager, to better adapt their message to the audience.

Step four stems from the idea of 'key messages' going hand in hand with establishing the level of detail of the information that will be sent to each stakeholder. Evaluating what information should be shared with different stakeholders is, therefore, the fourth step of creating a communications plan, and this is done by classifying the information into the following levels (McEachran, 2017):

- *Level 3:* The most basic type of information, which provides low-level details on the organisation's objectives, communications channels, and information regarding their products or services.
- *Level 2:* All Level 3 information, as well as more information for internal stakeholders, such as information on finances, training opportunities and feedback policies.
- *Level 1:* All information from the previous two levels, with further context for project members, by providing status updates on the project, and assigning duties and responsibilities.

Some information should not be shared with every stakeholder, not only for the sake of security, but also to maximise the communication efficiency within the organisation. Getting the right level of information to the right people ensures that every stakeholder is able to focus on what their role requires.

Step five involves selecting communication methods and channels (McEachran, 2017). There are plenty to choose from; however, they all ultimately rely on either speaking with someone or writing to them. Written media include email, SMS, printed publications, social media platforms, newsletters, flyers and website blogs. Oral communications include face-to-face meetings, events, demonstrations, television appearances and radio shows. Understanding which method or channel to use depends on a few factors, namely the organisational policy of the company, the availability and reliability of the channel, the type of message or information that needs to be sent, and the preferences of the stakeholder (McEachran, 2017). Understanding these preferences beforehand will help a project manager to proactively establish the most suitable communication systems. This research can be done through surveys, focus groups, personal interviews, observation and field trials.

Step six occurs once you have identified the methods of communicating with project stakeholders, and involves selecting the appropriate tool(s) for the job (McEachran, 2017). If a stakeholder prefers written communications, you need to decide whether emails, text messages, status reports or written reports are best. Depending on the organisational policy and the available assets, you can select from a variety of tools, such as email clients (like Microsoft Outlook or Gmail), messaging services (like WhatsApp and Slack), file sharing services (like Dropbox and Google Drive), and hard copy (on paper) communications such as memos, agendas or reports. The decision as to which tool is appropriate relies on a blend of stakeholder preference, pragmatism, and organisational policy and assets (McEachran, 2017).

Step seven is to establish a communication cycle, not only because it is important for you to communicate effectively with stakeholders, but also because feedback from these stakeholders can be invaluable in reaching project goals. A common example is of this is a cycle where staff

receive feedback from customers, document it, and share it with management, who develop required changes for the staff to implement (McEachran, 2017). When staff receive new responses from customers, the cycle begins again. Encouraging and processing feedback between other project stakeholders and the project manager ensures that all relevant and necessary information is shared among all project members in a timely way. A feedback cycle also allows 'two-way' communication, where each stakeholder gives and receives feedback on their work, input or communication (McEachran, 2017). Remember, the responsibility lies not only with the workers or team members to execute their tasks effectively, but also with management to lead and plan effectively. If there is a lapse in leadership or planning, management should welcome the opportunity to improve organisational efficiency.

Step 8, which is to plan a time frame and implement it using the framework laid out by the previous seven steps, happens once the details and nuances of your communications plan have been clarified (McEachran, 2017). Therefore, a good communications plan comes with a timeline. This timeline is based on the previously developed framework, but further clarifies when each stakeholder receives their information. Since it may be impossible (especially in large organisations) for the manager to communicate with everyone at once, the timeline establishes a 'roll-out' schedule for the communications. The simplest roll-out plan would involve scheduling meetings with each team or stakeholder, in order to discuss the project with them. More complex roll-out plans may involve a series of structure meetings that begin by introducing the project, followed by its objectives and progress through more detailed meetings, and conclude with initiating the project. At any time throughout this process, the manager may need to return to the research and planning phases in order to adjust their strategies and planning according to feedback they may receive (McEachran, 2017). The following figure is a simplified example of a communications plan indicating the type, frequency and medium of information required by each stakeholder, as well as the appropriate response times.

Stakeholder	Frequency	What information do they need?	Medium	Deadline (required in days)
Sponsor	Monthly	High-level information on costs, schedules, quality performance problems and proposed actions; presented by project manager	Meeting and written report	7
Upper management	Weekly	Detailed breakdowns of costs, schedules, quality issues and proposed actions	Meeting and written report	3
Organisation representative	Monthly	High-level costs, schedules, quality performance problems and proposed actions; presented by project manager	Meeting alongside project sponsor (minutes taken)	5
Project team	Weekly	Project progress with budget and schedule consideration, Quality issues and proposed actions	Project team meetings (minutes taken)	7
	Daily	Priority tasks for the day and proposed actions	Project team meetings	5
	Daily	Feedback from customer and sponsors	Written report	1

(Source: EDGE Learning Media (Pty) Ltd, 2020; adapted from Verzuh, 2015: 344).

Figure 6.11: An example communication plan

Step 9 of the communications plan is developing a budget for communications (McEachran, 2017). This will definitely be the case if the organisational assets (software, communications channels, training, equipment or transport) are lacking. The manager must then make provisions in their budget that take into account the development of proper communications infrastructure (McEachran, 2017).

Step 10, lastly, involves the recognition that a communications plan also needs to be monitored, evaluated and controlled (Verzuh, 2015: 362; and McEachran, 2017). Communications are only as good as the communications plan, so the manager (or responsible team/team member) must regularly evaluate the efficacy and transparency of the communications plan in order to forestall any potential issues, or to correct current ones. Regular evaluation of the communications plan with relevant key performance indicators (KPIs) is vital for clear, effective and strong communications within a project.



EXERCISE 6C

- Quality requirements can be classed as either functional or non-functional requirements. State two examples for each of these two types of quality requirements that a company producing hair shampoo may have.
- Create a list to summarise the key considerations that a project manager must take into account when developing their communications plan.
- You are in charge of a team with eleven members who are spread across South Africa, with some in Johannesburg, Durban and Cape Town, and one in Kimberley.

Required:

- Calculate the number of communication channels in this team.
- Name a method and a tool that you would use to communicate with the team for non-critical communications.

- Identify whether the following statement is true or false. Substantiate your answer.

You need to communicate only the goals and objectives that are relevant to your team.

6.6 THE RISKS OF INEFFECTIVE PLANNING

Many professionals agree that poor project planning is a critical mistake that frequently leads to project failure. It is impossible to account for something you are not aware of, and if you are not aware of the threats to the success of your project, or even the precise roadmap you need to follow to reach success, then it is unlikely that you will achieve your desired goals. Ineffective

planning in the aspects of risk, quality and communication exposes the project to a number of situations that can threaten its success.

6.6.1 Wasted budget

A project's budget is determined primarily according to the demands of the project documents. In other words, it is dependent on the resource allocations, work breakdown schedule, statement of work and project scope (Kerzner, 2017: 502). Once those have been determined, the budget needs to be adjusted according to the organisation's resources. Without adequate planning, there is a chance that the determined budget will be inaccurate, and the risk of resources being over- or under-allocated is much higher. Being underbudgeted in certain project processes can cause project delays, which may result in even more expenses. Likewise, overbudgeting in certain project areas may take away resources desperately needed in other areas. Regardless of over- or underbudgeting, a lack of planning will almost always result in budget inefficiencies, and increases the overall risk of project delays or failure.

Consider a project manager who did not spend enough time researching and developing cost estimates for their project. The risk to the project can take one of two dimensions. The project manager may underestimate the costs of resources and activities. This means that when they develop their budget, they will not have allocated enough funds in order to acquire the necessary resources. Consequently, they may not be able to acquire the required amount or quality of resources, which may result in having to seek authorisation for an expanded budget. In any of these cases, the health of the project and the manager's reputation will suffer.

Conversely, the manager may overestimate the costs for their resources. If the project manager requests too much money for their project, the organisation is functionally 'losing' money, since it is now fixed to a project, and cannot be invested or used on other ventures. While less disastrous for the project, the over-allocation of funds due to poor planning will impact the financial standing of the organisation and the reputation of the manager. These issues can be prevented by involving more stakeholders in the planning and estimation phases, as well as increasing the degree of transparency in the estimation and budgeting phases.

6.6.2 Stakeholders do not know what to expect

Stakeholders will usually develop expectations from the project plan that was presented to them. If the preparation that went into the development of the project plan is poor, then there is a good chance that the expectations of stakeholders will differ from those of the project team. Stakeholders often end up having to fill in the blanks, or being left with a feeling of uncertainty due to a lack of clarity on certain aspects of the project. This promotes an operational environment of low confidence for project stakeholders. Sufficient project planning gives stakeholders a plan of action, allowing them to embrace the project with confidence, as project objectives can be clearly achieved and any changes to the project road map will have been accounted for in the project plan. We have already discussed how customer satisfaction relies on having their expectations being met, so it follows that ensuring the project plan is clear will also help to anchor customer expectations to the business's vision.

Remember that each stakeholder has a unique risk appetite and risk threshold. If the project manager neglects to include the stakeholders in the planning phase, or if they neglect to develop a sound stakeholder engagement plan, then the manager risks creating uncertainty and unease in their stakeholders. Consider a large construction project where no one is informed of the risks, budgets, schedules or resources that are part of the project. The sponsors are unlikely to continue funding the project, the vendors will not know when to deliver their goods or when they will be paid, and the construction teams will not know when and where they are required, or even what safety precautions are being taken. Proper planning, therefore, must include all the relevant stakeholders, as well as the development of a stakeholder engagement plan, to ensure that all the necessary information reaches everyone involved in the project.

6.6.3 The project outcome is of no benefit

Not to be confused with the project objectives (the overall goals of the project), project outcomes are the measurable results of a project life cycle. These project outcomes are largely defined by the project outputs, also known as the deliverables. The project output can meet the required standards, while still failing to produce the desired project outcomes. For example, a project to design a new low-cost tablet for lower-income consumers may meet quality standards and produce functioning tablets, but they may be unpopular and fail to sell. The outcome in this example would be that a profitable product has not been met, even though standards and aims were achieved. A poorly planned project can fail to account for important variables that can affect the outcome of a project life cycle. Poor understanding of the market due to a lack of research, for example, could mean that a product released in a certain region may not have a high enough demand. Another area of concern is whether the project outcomes align with the organisation's outcomes. A film studio's desired outcome would be to create locally made movies that are profitable, for example. Their first movie could be a high-quality and interesting one (meeting its project objectives), but if it runs overbudget due to bad planning, then the organisation's outcome of profitability will not be met. Adequate planning will give the project manager a much clearer picture of whether the outcomes of a project will be of benefit to the organisation, or whether the project objectives should be re-evaluated.

This form of risk has several potential results:

- The project has a deliverable that no one wants or needs
- The project deliverable is harmful in one or more aspects
- The project deliverable can only be served at a financial loss

These outcomes can be avoided by engaging with proper market research, focus testing, design and review, and estimation procedures.

6.6.4 Lack of support from stakeholders

A project plan needs to inspire confidence in its stakeholders. The impression that potential stakeholders will form of the project will be largely dependent on the plan that is presented to them. If they do not have a clear picture of what they are investing resources into, then they will

be less likely to take that risk. Getting all the necessary project stakeholders onboard with the project objectives is vital to its success. Sponsors need to be secured, customers and clients need to have confidence in the project objective and its deliverables, and team members and partners need to have clearly defined roles and responsibilities.

The risk of lack of support is strongly related to not letting stakeholders know what to expect, or not engaging with them properly. This could result in team members leaving or sponsors and financiers withdrawing their funding. Establishing a proper communications and stakeholder engagement plan will help the project manager avoid these pitfalls. Managers should also regularly ask for and implement feedback from their stakeholders. Remember, the project manager is there to ensure the vision of sponsors and clients is reached.

6.6.5 Lack of interest among teams

A lack of a clarity on the goals for members of the project team can cause frustration and demotivation. Team members need to know what their roles and responsibilities within the project will be, and what the overall aims and outcomes of the project are. There should also be measurable outcomes for the tasks that they are responsible for completing. In order for this to happen, roles and responsibilities need to be identified and clearly defined during the project planning phase, using tools such as the WBS. Having team members perform contextless work can result in a lack of motivation and a general lack of pride in their work outputs.

The project teams are responsible and necessary for the speedy and accurate execution of a project. If the project manager neglects to engage their team completely, then the teams will lose interest in the project. This has the consequence that the project schedule, budget or quality may suffer, which the project manager can avoid by ensuring that the clarity and scope of the project are defined. After doing this, the project manager can consider team building exercises or, perhaps, incorporating a culture of gifts or rewards.

6.6.6 Project delays

Poor planning and a lack of contingency plans increase the likelihood of project delays. Inaccurate scheduling means that team members may be operating without a clearly defined schedule, which can promote poor productivity. Otherwise, they may be using one that has been defined but cannot be realistically achieved because it is too short, leading to project delays. Additionally, poor planning can also mean that team members are not completely clear on what is expected of them within their project roles. Together, these factors will contribute to tasks that are not completed on time and work that is not of an acceptable quality standard, which, once again, causes project delays.

Planning an agreed standard of quality, establishing clear roles and responsibilities for team members, and mapping out realistic schedules that can be effectively communicated to stakeholders will result in achievable deadlines and a much higher level of satisfaction among all project stakeholders, both internally and externally.

6.6.7 Loss of clients

Poor planning will often lead to expectations for project deliverables not being met. We have already discussed how planning documents help to connect the project's direction to stakeholder expectations. This means that failing to plan correctly can lead to a mismatch between client expectations and what is delivered. Postponement of deadlines, poor communication of project progress, unforeseen expenses and the production of deliverables that do not meet client requirements or quality standards are potential outcomes that can cause the loss of clients for an organisation. Once the confidence of a client is lost, it is not easily regained, and any potential work through them in the future will be lost to the organisation. An effective project plan will enable the organisation to attain project objectives efficiently and maintain constructive communications with clients, even when expectations on the project need to be tempered, such as in the situation of unpreventable delays.

6.6.8 Damage to professional reputation

Just as poor planning can lead to the loss of clients, it can also cause severe damage to the reputation of an organisation, because it is directly linked to the satisfaction of its clients. In fact, to a large degree, it is linked to the satisfaction of all of the stakeholders associated with the project. A construction company may complete projects that please its clients, but if their projects cause delays and damage to public property and roads, or affect the environment, the public or government, they may still suffer reputational damage. An organisation that fails time and time again to meet the expectations of its stakeholders will develop a perception of incompetence within its the market, which may eventually lead to the downfall of the organisation.

Along with harm to the organisation's reputation, failing to meet outcomes, causing harm or otherwise causing stakeholders to be dissatisfied, will mean that the project manager's reputation will suffer. If the project manager becomes known as someone who regularly fails to meet project objectives, wastes budgets, loses clients, or produces inferior deliverables, then they are less likely to be hired or to be given projects to manage. Damage to your reputation means a loss of income and a loss of opportunity. In order to provide the best possible service to the project and to yourself, you must plan as thoroughly as possible.

6.7 CONDUCTING THE KICK-OFF MEETING

The kick-off meeting signals the start of the project. These meetings bring all stakeholders together in a face-to-face situation and mark the beginning of the execution phase of a project (Kerzner, 2009: 421). These meetings include all 'upper' and 'middle' stakeholders, such as managers, experts and team leaders. They create a personable atmosphere to communicate the gravity of the project commencing.

Depending on the size, complexity and time requirements of the project, it is possible for multiple kick-off meetings to occur. The initial kick-off meeting will potentially discuss any number of matters, such as the following subjects (Kerzner, 2009: 421–422):

- Accountability, responsibility and authority structures of the project
- The scope and requirements of the project
- The measures by which success or failure are determined
- Any related wage, salary or remuneration concerns

Kick-off meetings have a similar structure throughout most industries. They begin with the project manager, sponsor, or client introducing themselves and the project. These stakeholders will also define the project scope and requirements, as well as the success criteria, and discuss how they can best serve the project team and the interests of the project. Often, these meetings will also situate the project within the greater environmental, business, or organisational context, in order to provide a 'big picture' understanding of the importance of the project. Once the leadership has been introduced, the meeting will pivot to the project team and the various vendors. These stakeholders need to be familiar with each other to ensure the efficient completion of tasks, orders and deliveries. Lastly, some organisations may use kick-off meetings as team building opportunities. Activities or gifts that are designed to promote a sense of unity and project identity among the team may form part of the team building steps (Verzuh, 2015: 355).

The kick-off meeting may be used to establish or communicate the budget and schedule for smaller, shorter projects. However, for larger or longer projects, estimation, budgeting and scheduling may take up to several weeks. In these cases, the kick-off meeting will be used to establish and communicate the preliminary schedule for the completion of these tasks (Kerzner, 2009: 422). This will ensure that the team members know when to expect their schedules, budget or resources, and allows the project manager to roll out the plans periodically in order to ensure a constant stream of information and activity in the project. The milestones that a cost estimation schedule should achieve are the following (Kerzner, 2009: 422–423):

- *The pre-kick-off meeting:* Also known as the estimate kick-off meeting, this meeting involves the stakeholders who are responsible – or have the necessary expertise – for developing the cost estimates of a project. These meetings need to be long enough to ensure that everyone understands the project scope, baseline, constraints and requirements. These meetings are typically scheduled two to three months ahead of the estimate deadline, in order to encourage sufficient planning, feedback, and appropriate discussions on the project estimates.
- *The review of ground rules meeting:* Once project members have had enough time to assimilate and contemplate the content of the kick-off meeting, the manager will schedule a review of rules meeting. These meetings typically occur shortly after the kick-off meeting – usually a matter of days, not weeks – and are used to discuss feedback, answer questions, assess potential problems or risks, and ensure that all project members are comfortable with the rules and protocols set forth in the kick-off meeting.
- *The resources input and review meeting:* Once each team has had ample time to conduct their initial estimates – usually a few weeks – the manager schedules a review meeting. These meetings are used to assess and evaluate the estimates that each team has developed, in order to forestall any duplications, unnecessary estimates or omissions in the estimates. These meetings are crucial to ensure that the estimates that are generated align as closely as possible with the actual requirements of the project.

- *Summary meetings and presentations:* After the estimates have been finalised and priced, the project manager schedules a series of summary meetings. These are used to present the estimates to stakeholders further along the authority or responsibility hierarchy. The initial meetings – either for practice or for lower-level members – are used to determine any final errors in the estimates. Once all the errors, inconsistencies, omissions and overlaps have been reconciled, the final estimate documents are presented to upper management for final approval. In other words, during this phase, practice presentations (or dry runs) are performed before the final presentation to upper management.

6.8 REVIEWING THE PLANNING PHASE

Before moving on to the execution phase of the project plan, it is important to review what has been planned for execution. The project plan can go through multiple iterations of review during the planning phase before it is considered satisfactory for implementation. The factors that determine whether the project plan is ready to leave the planning phase are known as exit criteria. The following are exit criteria specific to the planning phase (*United States Department of Health and Human Services*, 2012: 39):

- The project scope has been clearly and completely defined. Additionally, the scope and business case of the project are in harmony with the need that the project must satisfy. This criterion ensures that the project is 'fit for purpose', and that the deliverable will align with the client's or sponsor's needs.
- A holistic project plan provides a detailed overview of the entire project. Clearly defining KPIs, deliverables, and risks for only a single aspect of the project will not guarantee project success. The project manager must ensure that each aspect of the project has clearly defined scopes, objectives, review processes and deliverables.
- The client's requirements, as well as quality standards, for each deliverable have been clearly defined. The project manager must also clearly define which deliverables (or which aspects of them) are functional, and which ones are non-functional. This will allow team members to better plan and assign tasks and resources.
- The procurement plan has been thoroughly reviewed, the relevant stakeholders have been contacted and involved in the plan, and all necessary contracts have been developed. Further, the project manager has allocated the budget necessary to fulfil the contracts.
- The project manager has thoroughly investigated the risk appetites and risk thresholds of each stakeholder, and subsequently developed a risk assessment matrix. Additionally, the project manager has defined contingency and risk mitigation strategies in order to control and mitigate the occurrence and impact of risks.

There are also a few exit criteria that are important for all phases of the project life cycle, which are listed as follows (*United States Department of Health and Human Services*, 2012: 43):

- Cost and schedule variances from baselines have been identified and, where possible, corrective action plans have been put in place to mitigate variance.
- Investment baselines have been reviewed and deemed satisfactory.

- The various project documents (such as the risk management plan, communication plan, work breakdown structure and quality management plan) have been evaluated, reviewed and adjusted in a manner that furthers the value and efficiency of the project.

The initial review is an internal meeting among the project manager and the project team, which ensures that the project baseline and budget are in synergy (*United States Department of Health and Human Services, 2012: 40*). This means that the budget is sufficient to accomplish the necessary work. This type of review – known as an initial integrated baseline review (IBR) – also establishes a set of KPIs by which the baseline is evaluated. After all, in order to avoid frustration or disappointment, the project baseline needs to be realistic and achievable (*United States Department of Health and Human Services, 2012: 40*).

The final review step, known as the project baseline review, is the stage-gate review of the planning phase for the project. This step will essentially determine if the project is ready to enter the execution phase. The more independent the review team can be of the project, the more rigorous the scrutiny can be. The review team can comprise organisation executives, senior project professionals within the organisation, or other senior project management staff, executives or professionals from a different division or organisation. The important condition is that they have sufficient training and experience to be able to conduct an effective review. It is also important that they have sufficient time available to spend reviewing the project plan, and that there is some level of incentive for their review to be of a high standard, be it reputational or financial.



EXERCISE 6D

- Ineffective planning poses risks to a project, many of which will affect stakeholders outside of the core project team. Discuss three risks that can negatively affect these stakeholders.
- The kick-off meeting is said to mark the beginning of the execution phase of the project. In larger, more complex projects, a cost estimation schedule needs to be conducted prior to the kick-off meeting. Outline the four meetings that will usually precede the kick-off meeting.
- A review of the project planning phase is conducted according to exit criteria. Briefly mention five exit criteria specific to the planning phase of a project.

6.9 PROJECT MANAGEMENT IN PRACTICE

Consider the following hypothetical scenario and answer the question that follows.

At the beginning of this unit, we looked briefly at Alice and her pottery business, which she wishes to expand to reach new customers in neighbouring communities. With extra funding secured, she

is finally able to pursue this dream, but one of the funders has raised a question about how she will guarantee success in this new project.

Hers is not the only pottery business in these areas, and so her expansion will bring her into competition with other businesses. Talking with her funder, she is convinced that her products are high quality – this is what drew them to her business in the first place. However, now she is aware that she needs to consider making risk, quality and communication plans, which she can use to make an overall project management plan. However, she has no real experience drawing up these different plans, so she has come to you for help.

Required:

Consider the changes to Alice's current project environment, such as the scaling up of production, interaction with new clients, potential changes to product requirements and more distribution requirements. For each of the three project plans (risk, quality and communication), describe a tool, technique or strategy that can aid in the development or implementation of the plan.

6.10 SUMMARY

At the beginning of the unit, we read that success is planned for, which is elaborated on thoroughly throughout. Risk planning allows the project team to identify potential risks to the success of the project, and plan for them with mitigatory or contingent strategies. Quality planning explains the necessary quality requirements and standards for project processes and deliverables, promoting consistency and, in general, a higher value product. Communication planning puts strategies in place to effectively convey information between project stakeholders, which improves relations, raises morale and improves operational efficiency.

Project planning can be summarised in two key words: 'confidence' and 'efficiency'. Planning allows the project team to identify factors that would otherwise be considered an unknown, or poorly understood, which enables them to operate proactively, rather than reactively. With a plan of action and no the fear of unknowns, the project manager and their team can execute the project objectives without hesitation, and have a clear roadmap to success.

PART

4

PROJECT EXECUTION

Part 4 comprises the following three units:

Unit 7: Managing scope, schedules, costs and quality

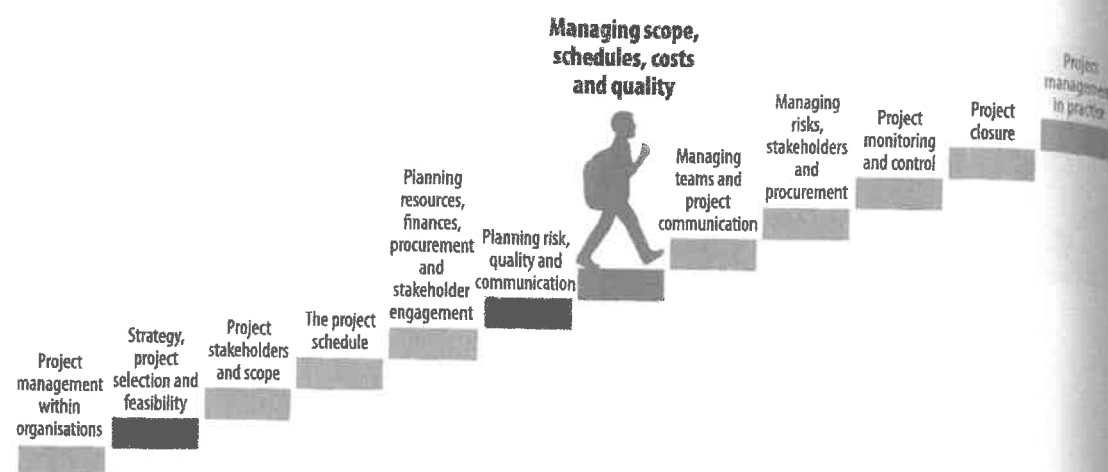
Unit 8: Managing teams and project communication

Unit 9: Managing risks, stakeholders, and procurement

7

MANAGING SCOPE, SCHEDULES, COSTS AND QUALITY

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7.1 INTRODUCTION

You have been employed as a project manager for a non-profit organisation (NPO) that works with people who have committed crimes. The goal of the NPO is to help reintegrate criminal offenders into society and limit repeat offences. This is called offender reintegration. Offender reintegration programmes provide counselling, life skills training, and any other relevant training that will help participants to rejoin society and not return to a life of crime. Offenders must attend compulsory sessions, participate actively in the session activities and discussions, and complete any tasks assigned to them.

The NPO is starting a new offender reintegration project that focuses on young offenders between the ages of 14 and 18. The goal of the new project is to run the service at six magistrate courts, work closely with the police force and the court system to gain support for the programme as an appropriate sentence for young offenders in certain instances, and ensure that the programme decreases the risk of them becoming repeat offenders in future. The programme will be run at the various magistrate courts, in facilities made available to the NPO.

The NPO wants to offer life skills programmes to teach the young offenders decision-making, communication and anger management skills. They will also learn skills like self-control, problem-solving and goal-setting. These key skills will enable them to re-enter society successfully, as functional members of their communities. Offenders will also be required to participate in skills development courses that focus on helping them find employment, such as basic computer literacy, job interviewing and curriculum vitae (CV) development.

Your role as the project manager is to successfully implement this project at the six chosen locations, and reach 500 young offenders within 12 months of the project start date. You need to make sure that the project is well run, well staffed, well resourced and properly implemented.

In this unit, you will learn about managing project scope, schedules, costs and quality during project execution. In previous units, you covered the project planning stage, and the different processes and documents that are necessary when planning a project. In this unit, you will learn more about how to implement your project plans in a way that supports successful completion of the project outcomes.

In this unit, we will discuss the key project management components of scope management, schedule management, financial management and quality management.

Note that you will encounter three common learning points throughout this unit:

1. Communicating clearly and consistently
2. Engaging with the project team in a structured way regarding:
 - performance;
 - emerging issues; and
 - the possible need to make changes to formal project documents
3. Developing structured processes to deal with proposed changes to formal project documents

These are the key learning takeaway points of this unit, and are summarised in the following figure. You can see that clear and consistent communication, consistent and structured team engagement, and structured change processes are essential to managing scope, schedule, cost and quality changes in project management. If these three things are in place, you as the project manager will be able to effectively manage change in your project.



After studying this unit, you should be able to:

7.2 KEY TERMS AND DEFINITIONS

- *Budget*: The project's financial plan, which describes how much money is available for each project output and each output's related activities.
- *Financial management*: The management of the project funds in the form of budgeting, controlling expenses and ensuring that money is not wasted.
- *Project scope*: The focus area of the project, including the final desired product or service.
- *Quality management*: The overall process of managing quality throughout the project life cycle.
- *Quality assurance*: The methods and processes put in place to reduce or eliminate waste, error, defects and mistakes during project execution.
- *Quality control*: The ongoing quality checks done at various stages of the project to ensure that the quality assurance processes are working, and that the project is delivering at the required quality standards.
- *Quality standards/indicators*: Descriptions that spell out what a high-quality service, process or product looks like. These are what the quality controllers check the products or services against.
- *Schedule management*: The project timeline. Each project task or activity is allocated a due date.
- *Scope creep*: The ad hoc addition of new, unplanned tasks to the project scope.
- *Scope management*: The day-to-day management of the project scope, which ensures the project does not deviate and take on new, unplanned tasks along the way.

Scope management ensures that the project stays focused on the key deliverables it is required to meet (Wysocki, 2019: 117). The greatest challenge in scope management arises during project execution, when the project team becomes focused on task or activity completion. It is very common for team members to lose sight of the project scope. It often happens during project execution that the project team identifies areas that need further work or adjusting. This is an inevitable part of project execution; no matter how good your planning is, unexpected issues will always arise during execution.

A good project manager allows the project team to make suggestions and present ideas to help achieve the project deliverables. At the same time, the project team should not have the power to make decisions regarding changes and additions. Changes and additions need to be carefully considered, and a final decision must be authorised by senior management. This is to ensure that scope creep does not occur.

Scope creep occurs when new activities or tasks are added to the project, or the project boundaries are expanded (Lewis, 2011: 379). It negatively affects the project budget and timeline as it involves new work that was not accounted for in the project budget, or included in the work breakdown structure (WBS) and Gantt chart.

In the following example, we explore the concepts of scope creep and scope management.

EXAMPLE 7 A (Scope creep and scope management)

Scope creep

You have started the roll-out of the young offenders programme at the six magistrates' courts, where offices have been made available to your NPO for programme work. The magistrates are pleased with the programme, and some have mentioned it to their colleagues. You receive a call from another magistrate about implementing the programme at another court. However, if you were to approve this, it could cause scope creep for the following reasons.

Scope	Negative effect (scope creep)
The project deliverables are for six sites only.	Adding another site will create more work to complete within a time frame designed for six sites.
The budget is for six sites.	There will not be enough money to complete all the work required for seven sites. Costs would need to be cut, which could negatively impact the ability to achieve the project deliverables.

(Source: EDGE Learning Media (Pty) Ltd, 2020)

Table 7.1: Possible scope creep in the young offenders programme

As you can see, the project scope must be managed carefully. Even the smallest change could have a negative impact and cause your project to miss deadlines or exceed the budget (Lester, 2017: 27).

We will now explore three elements of scope management: communicating, aligning and managing. It is important to note that these elements overlap with one another, and are not distinct separate processes. They support scope management, and often contain similar outcomes (in other words, they have the same end results) and follow similar processes. For this reason, you may notice some repetition in our discussion.



(Source: EDGE Learning Media (Pty) Ltd, 2020)

Figure 7.2: Three elements of scope management

7.3.1 Effectively communicating project scope

Effective project scope communication ensures that everyone on the project team fully understands the project aim, the required deliverables and the boundaries of the project. It is also beneficial to communicate the project scope to external parties such as stakeholders (Lester, 2017: 42).

An important part of being a project manager is ensuring that all internal and external parties are fully informed of the project scope. This reduces the possibility of scope creep, and will help you to communicate clearly and appropriately when rejecting suggested new tasks and activities. Creating and managing a high-performance team requires that everyone has the same understanding of what is required. It is also important for your external stakeholders to clearly understand what you are delivering, to prevent false expectations. Communicating properly regarding the project scope helps to eliminate confusion and error (Wysocki, 2019: 121).

Clear communication requires ensuring that everyone has access to the information they need, when they need it (Lewis, 2011: 506). For this reason, you should have a shared-access project document repository, such as a drive or folder, that everyone can access. Send regular reminders to the team about where the project documents are located, and always ensure that the documents saved in the repository are the latest and correct versions.

Communication of the project scope can take on various forms, depending on the length and complexity of the project. Examples of communicating the project scope include the following:

- Having a detailed project scope review at the internal project kick-off meeting
- Reviewing the project scope with new team members who join the project during execution
- Reviewing the project scope with external stakeholders during a meeting or short workshop

- Sending regular reminders about the project scope embedded in project communication on a daily/weekly/monthly basis

The project scope should not only be reviewed during the internal project kick-off meeting, but on an ongoing basis throughout the project life cycle (Lewis, 2011: 506). It would be a mistake to only review the project scope when dealing with scope creep issues. Having a quick project scope review at regular intervals will:

- help the project team remain focused on the overall project deliverables, and not get lost in the smaller tasks and activities;
- keep the project running smoothly; and
- help the project team keep an eye out for possible scope creep.

In the event that formal changes are made to the project scope statement, you must communicate clearly to all project team members that this is the case, send out a revised project scope statement, and replace the outdated version in the document repository. However, it is not enough to simply upload documents to a server or drive and assume that people will take the time to read the documents.

As the project manager, you must provide structured opportunities for the project team to review the project scope. A detailed project scope review during the internal project kick-off meeting is essential. Having a similar, but condensed, review with external stakeholders is also very helpful.

A good strategy is to include a short project scope review in the monthly project team meeting agenda. Making this a standard agenda discussion point will keep the project scope at the forefront of the team's minds.

Your project could also benefit from having a simple, one-page synopsis that is quick to read and understand. To develop such a brief, you would take the essential parts of the scope statement and convert them into simple bullet points. This can also be made available to external stakeholders.

Common project management tools

There are several common project management tools that can be used to communicate the project scope. We will discuss these tools in the following sections.

Project communication plan

The project communication plan maps out the internal and external communications that will be taking place within the project (Didinsky, 2017: 159). Internal communications refer to the communication directed at internal organisational staff, which can also include staff in other departments, such as finance or human resources. External communications refers to communication directed at people outside of the organisation, such as stakeholders, project partners, government, service providers, contractors and the project client. You should include a section on project scope communication in your overall project communication plan (Didinsky, 2017: 40).

The following table presents a basic communication plan template.

General project communication				
Stakeholder receiving communication	Information to be shared	Communication methods	Frequency of communication	Sender of communication
Communicating changes and decisions				
	Who receives the communication	Communication methods	Sender of communication	
Scope changes				
Budget changes				
Quality management changes				
Schedule changes				
Other changes				

(Source: EDGE Learning Media (Pty) Ltd, 2020; adapted from Dionisio, 2017: 119–120)

Table 7.2: Communication plan template

Project scope statement

The scope statement is a detailed description of the project deliverables, outputs, outcomes and boundaries. Some generic examples of the kinds of information contained in a scope statement include the following (Dionisio, 2017: 45):

- Project name
- Project client
- Project budget
- Project inputs, outputs, outcomes and deliverables
- Project specifications (any specific requirements for the project, such as translations, specific formats and functionality)
- Project acceptance criteria (the conditions on which the client will accept the completed project)
- Project exclusions (a list of items or functions that are related to the deliverables, but that the project is specifically or deliberately not including – this is to ensure that these exclusions are not assumed to be part of the project and added in as scope creep)
- Project milestones (a list of the major project milestones)
- Project team members

Project charter

The project charter is a high-level, highly detailed description of the project as a whole. It typically includes the project purpose, deliverables, project scope, project risk, budget information, a major

milestone timeline, a list of key stakeholders, details on the project management and team etc. (Project Management Institute 1, 2017: 81).

The following is a simple example of the main items normally found in a project charter.

Project charter	
Team values and principles (The project team's core values)	
1.	
2.	
3.	
Team meeting guidelines (The guidelines to be followed at every team meeting)	
1.	
2.	
3.	
Project communication (List the different ways in which communication will take place, mentioning any specific communication platform that might be used, such as WhatsApp Business or Slack)	
1.	
2.	
3.	
Project changes (The process is mapped out step by step)	
1.	
2.	
3.	
Decision-making (The process is mapped out step by step)	
1.	
2.	
3.	

Conflict and disagreement resolutions

(The process is mapped out step by step)

- 1.
- 2.
- 3.

Project client to approve these changes

(A list of the changes that require client approval)

- 1.
- 2.
- 3.

Project manager's signature

Team members' signatures

(Source: EDGE Learning Media (Pty) Ltd, 2020)

Figure 7.3: Project charter

Project 'one-pager' brief

This is a quick reference tool that summarises the main points of your project scope. It is generally used as a refresher for your internal project team, or as a project orientation tool for your project stakeholders.

A project one-pager brief could consist of the following condensed information:

- Project name
- Project location/s
- Project outcomes and objectives
- Project deliverables
- Project stakeholders
- Project time frame and milestones

Shared document repository

This is a digital location where all the project documents are stored, so that all team members can access them at any time. This is normally on a company's internal server, or on an Internet-based server such as Google Drive.

7.3.2 Aligning project tasks and deliverables with the project scope

Aligning project tasks and deliverables is an important step in managing scope creep. As mentioned earlier, many unforeseen issues and demands may appear during project execution.

Your role as the project manager is to ensure that these emerging issues and demands are taken into consideration and added to the project scope in a controlled way, if they add value to the project's objectives. You also need to ensure that the project staff do not add in ad hoc tasks and activities to the Gantt chart or WBS during project execution.

The project manager needs to ensure that the project deliverables are reached on time and within budget, and according to the specified scope. However, as we know, work seldom goes strictly according to plan, and issues that emerge will need to be discussed.

You need to ensure the project responds flexibly to new information and issues, while still staying on track with regard to budget and schedule. You also need to make sure the overall scope of the project does not get lost in the busy day-to-day work the project team focuses on during execution.

It is easy and common for projects to experience scope drift or creep once the project enters execution. This is an inevitable result of people concentrating on their daily or weekly task list to get work completed by the due date. One of your key jobs as a project manager is to keep the project team on track regarding the project scope.

Having regular scope checks and reviews during your scheduled project team meetings will help keep the team focused on the project scope, and help them to identify possible areas where scope creep may be occurring. At the same time, these reviews serve as opportunities to discuss and identify new issues or challenges that may need further exploration, and could possibly be added into the project scope (Lester, 2017: 27).

As we have discussed, reviewing the project scope should be an ongoing activity throughout the project life cycle. Having a scope review on the formal project meeting agenda will help this to take place in a structured manner.

Useful questions to ask during these scope reviews include the following:

- Is anyone working on an activity that has not been budgeted for?
- Is anyone working on an activity that falls outside the scope statement of the project?
- Is anyone working on an activity that is not in the project schedule?

7.3.3 Scope changes and scope creep

Scope changes occur when changes are made to the project scope, typically during project execution. While these changes may be necessary, they should be controlled and managed. As we know, unmanaged changes to the project scope are called scope creep. This results from the

project team making ad hoc additions to the project tasks and activities that are not reflected in the WBS, project budget, Gantt chart or scope statement (Wysocki, 2019: 31).

As the project manager, you do not want to dismiss new suggestions and ideas that may add value to the overall project objectives. At the same time, you need to guard the project against scope creep (Lewis, 2011: 379).

When issues and demands are brought to your attention by the project team, you need to do the following:

- Assess the need to make changes to the project scope
- Explore possible alternatives for fixing the problem or solving the issue
- Assess the impact on the project timelines and budget
- Make an informed official decision
- Communicate any changes to the scope statement clearly to the project team

Let's look at the following example.

EXAMPLE 7 B (Scope changes)

You have now launched the young offenders programme at three of the locations. The staff at each have all attended a workshop regarding the project scope, contents and structure. All major role players support the project, and have agreed that qualifying young offenders will receive sentences that require them to participate in the programme. Your staff have been trained and are ready to start running the programme.

You receive your first set of sentenced offenders and begin running the life skills course. A court prosecutor then asks one of your local project coordinators if they can include a programme on substance abuse, as a lot of the offenders abuse drugs, and many were charged with committing crimes related to drugs. On the face of it, this appears to be a reasonable request and makes a lot of sense. Your local project coordinator feels that adding in a few sessions on substance abuse will support the project outcomes. They tell the staff to include two sessions on drug abuse in the life skills programme.

You are first made aware of these scope changes at the next monthly project meeting, and are understandably concerned about the impact this change will have on the project time frame and budget.

This is a good example of scope creep. Even though the scope changes add value to the project's overall goal, the following problems will emerge:

- The life skills course is an eight-session programme. With the scope changes, the programme is now ten weeks long. This means that the facilitators will need to be paid for an extra two days each. This is not covered in the budget.

- New programme material needs to be researched, written up and printed. This is not covered in the budget.
- Staff need to be trained on the new material. This is not covered in the budget.
- Because the life skills programme is longer, this impacts the project schedule, and could negatively affect the total number of young offenders reached by the project end date.
- The monitoring and evaluation tools for the life skills programme now need to be redeveloped to include substance abuse, and the staff need to be trained on the new tools. This is not covered in the budget or the schedule.
- Substance abuse is a specialist area. If offenders are addicted to drugs, attending two sessions on substance abuse will not address their addiction. This means that the project runs the risk of not having the desired impact of reducing the likelihood of participants committing repeat offences. If many offenders continue to commit crime after completing the programme, the courts will stop referring them to the programme. This may impact the overall effect of the project.

Here, you can see a clear example of how a simple addition of two extra programme sessions could compromise the entire project's success from a budget, schedule and impact perspective.

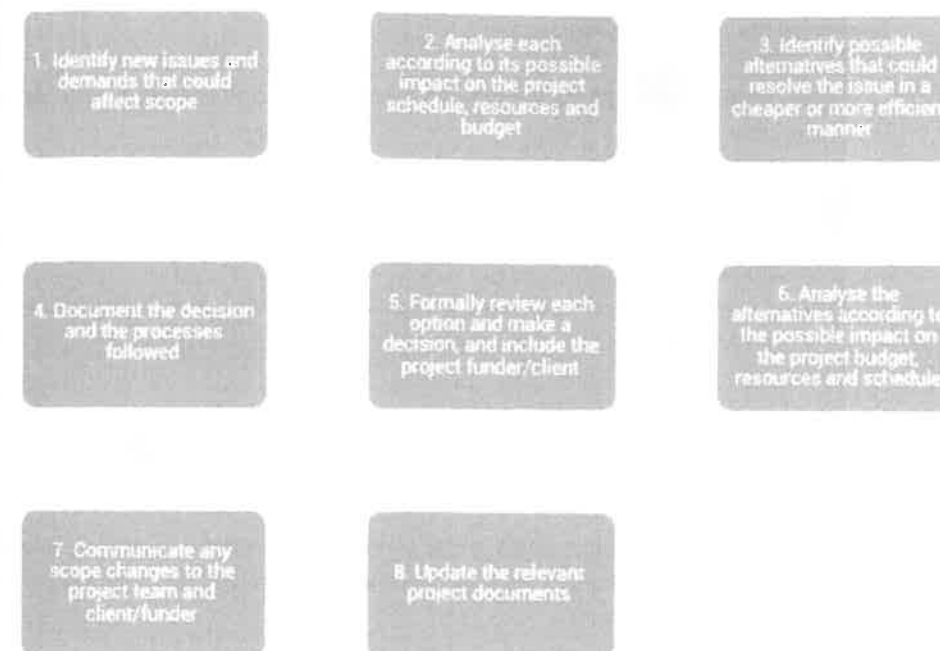
Managing the scope

In the previous sections, we discussed the importance of carefully orientating your project team to the scope at the internal project kick-off meeting. Having a fully orientated team from the beginning will help eliminate confusion and issues later on. Similarly, having regular, structured project scope reviews embedded in the weekly/monthly project team meetings will help keep your project team on track, and reduce the risk of scope creep. This will also help keep them focused on possible scope creep.

The project manager must invest ongoing effort into keeping the team focused on the core deliverables and watching for potential scope creep. While the project manager is ultimately responsible for the project, engaging the team collectively in watching for scope creep and monitoring the project deliverables will help ensure everyone is on the same page and shares the same priorities.

We will now look at the processes to follow when your team identifies an issue that needs to be discussed and a decision must be made in response to this issue. These issues must be reviewed thoroughly before a decision is made regarding whether to make changes to the project (Kerzner, 2017: 751). Therefore, your role as the project manager is to keep the team and project balanced between keeping to the structure required to reach your deliverables on time, and having the flexibility to respond appropriately to new issues (Wysocki, 2019: 31).

The following figure illustrates the essential eight-step process to be followed when managing possible changes to the project scope.



(Source: EDGE Learning Media (Pty) Ltd, 2020; adapted from Meredith et al., 2017: 258)

Figure 7.4: Eight-step scope change process

It is important to document the scope change requests, as well as the process followed in order to assess and approve or reject these requests. This ensures that ad hoc changes are prevented, and serves as proof that proper processes were followed and formal approval was obtained, in the event that there are queries about why changes were made (PM4DEV, 2016: 14).

The basic documentation should include a scope change request form, which must be completed and submitted to the project manager when a possible scope change has been identified. The analysis of possible resolutions should also be captured in writing to show that other alternatives were considered. The final decision to approve or reject the requested scope change should also be documented and kept on file for future reference (PM4DEV, 2016: 14–15).

Scope change request form

The following are examples of what information must typically appear on a scope change request form (Dionisio, 2017: 170):

- Requestor (name of the person making the scope change request)
- Description of the proposed scope change
- Justification (a detailed explanation of why the proposed scope change is seen as necessary)

- Impacts of the proposed change:
 - *Scope*: An assessment of the impact of the proposed scope change on the overall project scope statement.
 - *Quality*: An assessment of the impact of the proposed scope change on the project quality management plan.
 - *Requirements*: An assessment of the resources and other requirements for the proposed scope change.
 - *Cost*: An assessment of the estimated costs of implementing the proposed scope change.
 - *Schedule*: An assessment of the impact of the proposed scope change on the project schedule.
- Other possible alternatives
- Comments
- Final decision
- Communication requirements (a list of the communication that must take place as a result of the approved scope change, such as informing the project client, the project team and external project stakeholders)

This basic outline can be adapted to suit the needs of your project.

Let's return to our young offenders programme scenario. The problem faced was the inclusion of substance abuse programme content. After reviewing and discussing the requested programme addition, you as the project manager make the decision to form a partnership with another NPO that specialises in substance abuse prevention. This will allow quality specialised programmes to be delivered at no extra cost to the project. The substance abuse programmes will also run concurrent to the life skills programme on different days. This will ensure the project schedule is not affected. In this way, the chosen course of action includes the requested project scope change, but in a way that does not affect the project budget and time frame.

By having a proper scope management strategy in place, you ensured the project was responsive to the needs of the project stakeholders (the courts) and beneficiaries (the young offenders) without running any risks of scope creep. If you did not monitor potential scope creep, you would not have been informed of the changes to the life skills course, and would only have realised the negative impact it had on the project when it was too late.

A crucial part of managing changes is ensuring that the whole project team fully understands the need to control the change process. This requires you, as the project manager, to invest time in orientating your team to the processes that will be followed if changes are required, and involving your team in these processes as much as possible. Carefully reviewing the processes for making changes to the project during the internal project kick-off meeting will help with this. Ensure that your team understands the value of controlling changes, and the dangers of not controlling changes. It should be presented not as a process to make their lives more difficult, but as a process that makes project implementation smoother and less stressful.



EXERCISE 7A

Scope management

ABC Company specialises in producing web hosting services. For a set amount every month, people can buy space on a server, which ABC Company hosts and maintains. Because ABC Company only provides website hosting, it does not offer website development or any other similar services.

At their 2020 strategy planning meeting, a staff member suggests that ABC Company open up new services areas, including website development and website domain registration. Domain registration is the registration of a website name and web address. Adding these new services would require employing new staff and redeveloping the company's business management software.

Some of the senior management think that this is a good idea, while others feel that this is scope creep for the business. The chief executive officer (CEO) informs the management team that they will consider a proposal to increase their range of services if the proposal clearly shows how the new service would be introduced to the organisation without causing confusion or problems.

Required:

- How should the management of ABC Company go about assessing the impact of adding new services to their existing business model? Outline the information they would need and the steps they should follow.
- Some of the management team believes that it would be better to make all the changes to the business model at once, while others feel that it would be better to test one new service at a time.
 - Unpack the pros and cons of both approaches in detail.
 - State which option you prefer. Provide a reason for your answer.

7.4 SCHEDULE MANAGEMENT

In this section, we will review the importance of managing the project schedule, emphasising the importance of clear communication.

7.4.1 Communicating and enforcing the project schedule

The importance of clear and consistent communication with the project team is a *thread* that runs throughout this unit. As we have discussed, a project manager will need to invest considerable time in orientating the project team to the project schedule, reviewing the project schedule on a regular basis in a structured manner, and developing a set process for dealing with any changes that might need to be made to the project schedule (Didinsky, 2017: 159).

The project manager must maintain a fine balance between keeping the project on track with regard to deadlines and time frames, while still being flexible and receptive enough to respond appropriately to emerging issues that will occur during project execution. Having a rigid and inflexible project management style would result in the project completing on time, but you may weaken the successful achievement of the project objectives if you do not factor in real, emerging issues and challenges that affect the project schedule (Wysocki, 2019: 365).

Let's look at the following example.

EXAMPLE 7 C (Schedule changes)

The project schedule for the young offenders programme states that the project is to be implemented in June 2020. From January to May 2020, the project will focus on engaging with the court stakeholders so that the court supports the referral of young offenders to the programme. During the planning stage, the team felt that four months of stakeholder engagement would be sufficient to secure buy-in from the courts. However, the feedback from the project teams on the ground informs you of the following:

- Many magistrates and prosecutors are difficult to reach
- It is very difficult to find a time when most of the magistrates and prosecutors can attend workshops
- Meeting individually with each magistrate and prosecutor is possible, but the project team feels that it is better to have group engagement as well, so that the more supportive magistrates and prosecutors can encourage the others to engage with the project

As a result, only a handful of magistrates have committed to supporting the programme. When you start project implementation in June 2020, you will not have many offenders sentenced to your programmes.

After discussing the issue with your team, you decide to adjust the project schedule, and extend stakeholder engagement through June to December 2020. This means that you will continue to focus on stakeholder engagement parallel to programme implementation. This also requires some changes to be made to the budget, as funds set aside for stakeholder workshops would need to be spread over a longer period of time. A formal decision is made and documented, the project schedule and budget are updated, and the changes are communicated to the project team and to the project client/funder.

This is a simple example of how it may be necessary to adjust your project schedule based on issues and demands that emerge during execution. It also highlights the importance of having structured processes in place to make these changes. If you were to allow the project staff to make their own changes to the project schedule, these changes may:

- not be coordinated with other changes and decisions affected by the ad hoc changes

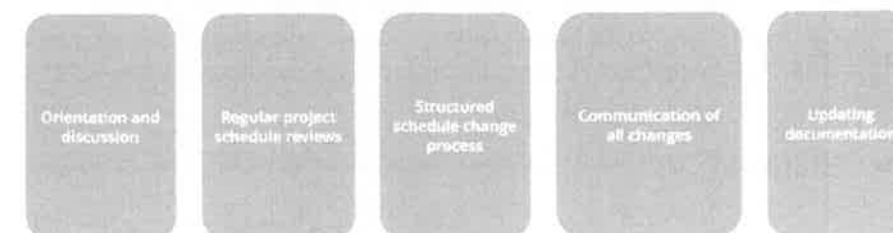
- not be reflected in the project budget, as the changes would likely have some form of financial implication;
- not be clearly communicated with the project team, whose planning would be affected; and
- not be clearly communicated with the client/funder, who may need to be informed of the schedule and budget changes.

Strategies to communicate around the project schedule

To effectively communicate around the project schedule, it is recommended to use very similar strategies and methods to what we discussed in the previous section, as follows:

- Have a detailed and thorough orientation and discussion of the project schedule with the whole project team at the internal kick-off meeting
- Include project schedule review as a standing item on the regular project team meeting agenda
- Have structured reviews of the project schedule at the weekly/monthly project team meetings
- Have a structured process mapped out where possible changes to the project schedule are discussed and analysed, and any decisions made are documented
- Communicate all changes clearly to the project team
- Ensure that all project documentation in the shared repository is updated

The following figure maps out the five core steps for communicating about the project schedule.



(Source: EDGE Learning Media (Pty) Ltd, 2020)

Figure 7.5: Strategies to communicate around the project schedule

Let's explore the structured process of managing project schedule changes in detail (Meredith et al., 2017: 258).

The first step is the identification of new issues and demands that have emerged during project execution. These issues will likely be identified by the project execution team or by project stakeholders.

Once the new issues and demands have been identified and unpacked, and the potential impact on the project deliverables has been outlined, they need to be discussed individually. Each new issue or demand will have a range of possible solutions, and each of these must be discussed and reviewed in terms of what it will cost to implement, whether cheaper or more effective solutions are available, and whether the new solution will impact the project scope, resources, schedule or budget. Once this detailed analysis has been mapped out for each solution, they will need to be reviewed, and a formal decision must be made on the best solution.

Once a formal decision has been made to make changes to the project schedule, the project client will need to be informed. It may also be necessary to inform project stakeholders if the change affects them. The entire project team will also need to be informed of the change, and all project documentation will need to be adjusted. If changes have been made to the project budget, the finance department will also need to be informed of the changes (Meredith et al., 2017: 258).

As you can see, it is very similar to the project scope management process outlined earlier in the unit. It is not necessary to have long and complicated processes to deal with changes to the project structure. You simply need to map out a basic process that you will follow, and then follow it each time.

It is also important to ensure your team understands these processes, and are involved in them as much as possible. This is to decrease the likelihood that they will make ad hoc changes on their own. They must understand the need for having a structured process for making changes to the project, and the dangers inherent in making ad hoc changes on the ground. If your project team understands that following the formal change processes makes things safer and easier for everyone in the long run, they are more likely to support and follow the processes (Lewis, 2011: 381).



EXERCISE 7B

Schedule management

An NPO is running a violence prevention project in Zwile, Port Elizabeth. The project consists of a range of programmes, run by different teams. These programmes include the following:

- Family support
- Academic support

- Youth access to further education
- Early childhood development

The project manager and their team have developed an annual plan for all activities across the different programmes. However, as the work begins, dates are changed and activities are moved around. Updating the electronic copy of the annual plan is not done frequently enough, and very few staff members have been updating their changes on the shared document. Before long, the project manager has no idea when programme activities are happening.

The staff provide verbal updates at the weekly team meeting, but even then, updates often change during the course of the week. On any given day, the project manager has no way of knowing what the staff are busy with. They are able to report progress against the plans at the end of every month by using the written staff reports and updating the annual plan, but they are not able to see what is happening on a daily and weekly basis.

Required:

- Identify and explain the possible reasons for why the project team is not updating the project schedule.
- Discuss the impact of these scheduling problems on the project as a whole, in terms of scope, financial management and resource management, if the current situation is not addressed.
- Advise the project manager on how they can resolve this problem.

7.5 FINANCIAL MANAGEMENT

As the project manager, you will need to work very closely with your financial manager. In most organisations, there is a single person who is responsible for the company finances. In larger organisations, it can be a team of people. You must ensure that the financial manager has all the information about the project and project expenditure that they need to keep accurate records and produce accurate financial reports (Didinsky, 2017: 178).

At the very least, the finance manager will require the following (Keulder and Benz, 2011: 8):

- The project scope statement
- An orientation of the project
- The project budget
- The project schedule
- Contracts, and banking and tax details of the people and organisations the finance department will be paying
- An asset list of all the equipment purchased for the project
- A projection of the expected weekly and monthly payments and other expenses
- Any financial reporting requirements specific to the project, such as report due dates and any required report formats

You will need the following information from your finance team to communicate to your project team and external service providers (Project Management Institute 1, 2017: 497).

Payment dates

Payment dates are set either once a month or twice a month. These are the dates on which your finance department will make payments. You will need to plan around these dates. If the payment date is the 5th of each month, you should inform your external service providers that they will only be paid then. This helps them plan their own income projections, and helps to maintain a smooth relationship. You do not want to be in a situation where service providers are hounding you for payment every day.

Expense reports

Expense reports should be reviewed against the budget, so you can see what has been spent and what is left.

Financial rules, policies and procedures

Your finance department will have rules that you must communicate to your project team (PM4DEV, 2015: 5). Such rules could include the following (Project Management Institute 1, 2017: 251):

- All invoices to be submitted seven working days before payment dates
- No payments made on quotations
- No cash on delivery payments
- All invoices and quotations to be either VAT inclusive or exclusive

Cost codes

Cost codes, also known as the chart of accounts (COA), allow the finance department to allocate expenses to specific budget lines. Each project expense will have a cost code that you must include on invoices for the finance department to make payments (PM4DEV, 2015: 7).

The following table shows an example of cost codes for a project.

Cost codes	Project budget
3000	Stakeholder workshop
3001	Programme manual printing
3002	Office stationery
3003	Office cleaning supplies
3004	Staff petrol

(Source: EDGE Learning Media (Pty) Ltd, 2020)

Table 7.3: Example of a cost code

When you submit an invoice for the stakeholder workshop to the finance department, you would include the cost code '3000' on the invoice. This allows the finance department to allocate all stakeholder workshops to the same cost code. Cost codes help produce accurate expense reports.

Invoices

Invoices are required to process payments for project expenses (Keulder and Benz, 2011: 13). You must check all expenses against the project budget before approving an invoice. This ensures that disallowed expenses are not approved. For example, if the project does not have a budget for staff training, and you receive an invoice to pay for staff training, you know not to approve it.

Once you have approved the invoice, it must be submitted to the finance department for payment. You should also review the project expense report monthly to check what has been spent and how much is remaining. This will affect your planning for the following month (Keulder and Benz, 2011: 15).

Your finance department will most likely require you, as the project manager, to sign each invoice before submitting it for payment. This is to ensure that all invoices are approved before payment. Your organisation may have specific rules for approving expenses over a certain amount. This is to provide an extra layer of control when making high-value purchases (PM4DEV, 2015: 16). As a result, you may need to get the approval signature of an executive manager when making these purchases.

7.5.1 Communicating and sticking to the project budget

The project budget is a vitally important project document. It provides details on how much money is available for the project activities. Project budgets can have different formats, but they should all contain the following information (Barned, 2012: 20):

- Budget line number
- Line item
- Description
- Budget amount
- Amount spent
- Amount remaining

The following table is an example of a project budget.

Number	Line item	Description	Budget amount	Amount spent	Amount remaining
1	Programme manuals	Design, printing and delivery costs for programme manuals	R 10 000	R 5 000	R 5 000
2	Staff transport	Petrol for staff vehicles and reimbursement for public transport	R 25 000	R 8 000	R 17 000
3	Stationery	Office and programme stationery	R 15 000	R 10 500	R 4 500

4	Stakeholder engagement	Catering, printing and venue hire costs for stakeholder engagement meetings and workshops	R 35 000	R 18 000	R 17 000
5	Salaries	Project staff salaries	R 300 000	R 167 000	R 133 000
6	Insurance	Insurance for project offices, equipment and vehicles, as well as third-party liability insurance	R 40 000	R 17 600	R 22 400

(Source: EDGE Learning Media (Pty) Ltd, 2020)

Table 7.4: Example of a project budget

In the table, you can see at a glance exactly how much money is left for, for example, catering. This helps to plan the project for a few months ahead.

It is important that the project team understands the range and limits of the budget, but they do not need to have access to the entire project budget. In other words, they will know there is a budget of R 35 000 for stakeholder workshops, but they do not need to see the staff salaries and other costs not relevant for project implementation.

In general, project managers do not share the entire budget with the team, only the sections of it that are relevant for performing their responsibilities. The senior team members, such as the site managers, will have access to more budget information than the broader team.

In other words, budget information is curated in a way that the project scope and other documents are not. Curated means that access to the information is controlled. The project manager will not post the project budget in the shared document repository. Only budget information relevant to the team responsibilities will be shared.

The reason for the curation of financial information is that most people struggle to read and understand budgets. Sharing the whole budget can create a lot of confusion about how the money is to be distributed among departments and activities.

A staff member who sees R 10 000 for programme manuals may think they can spend R 10 000 on printing manuals. In reality, the R 10 000 must cover design and layout, proofreading, printing and delivery. They also may not realise the R 10 000 must be shared between all six locations. They may also feel the need to spend the entire amount of money, because the budget allows for this. This can lead to fruitless and wasteful expenditure, as excess money is spent unnecessarily, instead of being reallocated to a different budget line.

Depending on the nature of your project, you may have the following:

- The full project budget, accessible to the project manager and finance manager

- A simplified implementation budget for the site managers
- A list of activities that are funded, so the project team can see that there is no budget for items that are not in the project scope and schedule

This helps to manage scope and schedule creep. Remember that analysing proposed scope and schedule changes requires assessing the possible impact on the project budget. Managing costs is an essential part of project financial management (Barned, 2012: 29).

You will have to decide what financial information is shared with which team members and for what reasons. This varies from project to project. The following question can help you to determine what to share:

- Do the staff need this information to make effective decisions?
- Can the senior staff member on site hold the financial information?
- Is not having this information on hand going to cause project blockages or delays?

Once you have selected the extent of financial information you will share, communicate this to the project team. If you have curated financial information, you will need to have a separate orientation with the senior staff on the ground, such as site managers, as they will receive more detailed financial information than the broader team.

The following sections provide an overview of the financial management process you will most likely experience.

Daily financial management

On a daily basis, you are likely to deal with ongoing queries from the project team about available funds for project activities, and whether or not submitted invoices have been processed. You will also process any invoices received from the project team, as and when they come in, to avoid a backlog of unprocessed invoices.

Bimonthly financial management

Payment of processed invoices will normally happen twice a month on set days. However, it may be the case that your organisation only makes payments once a month. You should ask the finance department to send you proof of payments, which you will then forward to the project staff, or directly to the external service providers being paid.

Monthly financial management

Once a month, you should review the project budget against the recent expenditure, and assess whether expenditure is going according to plan, and that important payments have been made. You should also update the amount of money available for expenditure for the next month, and inform the relevant project team members.

You will also review under- and over-expenditure on budget line items, and undertake corrective action if required. For example, if you see that a specific budget line is underspent, you will want to investigate why this is the case, and check to see if there are any obstacles or blockages that need to be removed from the project (Keulder and Benz, 2011: 15).

You will also need to discuss any budget issues, such as expenditure and payments, with the project team at the monthly team meeting.

Making changes to the budget

Changes to the project budget occur as a result of project scope changes, project schedule changes and new activities that the project team request that do not change the project scope or schedule, but were not budgeted for.

The following example shows a new activity request from the project team that does not impact the project scope or schedule, but does affect the project budget.

EXAMPLE 7 D (Budget changes)

The young offenders programme has now been running for seven months. One of the project site managers contacts you and asks if you will allow some of the staff to receive training on court procedures. The site manager believes that this additional training will help the project staff to better understand how the courts function, and this will enable them to work better with the prosecutors and magistrates. The training will cost R 5 000 for six staff members.

This request does not change the project scope or schedule, but it does have an impact on the project budget. You will have to look at the budget and see if you can find R 5 000 to spend on staff training, without taking critical funds away from key project activities.

Because you receive updated monthly project expense reports from the finance manager, you know that the office stationery budget line is underspent. This is because the offices at the courts received some donated office stationery and equipment. This allowed money to be saved. You can take R 5 000 from the office stationery budget and spend it on staff training. You check with the client/funder to get their approval, and then approve the training invoice of R 5 000.

If it becomes necessary to make changes to the budget because of scope or schedule changes, you should follow a structured process to ensure changes are made correctly. The authority to make changes to the project budget must lie only with the finance manager and the project manager. In most cases, it lies solely with the project manager. It is then the project manager's responsibility to ensure the changes are made correctly, and that the relevant senior people have the correct, updated versions of the relevant documents to work with.

This may involve creating a new, approved version of the budget. Ensure that all the staff who have access to the full version of the project budget have the most recent version to work with. It is very helpful to number the budget versions, so people do not mistakenly work with an older version, as in the following examples:

- Young offenders budget 2020 Version 2 June
- Young offenders budget 2020 Version 3 September



EXERCISE 7C

Financial management

Amanda is a site manager in Mpumalanga. She has a copy of the project budget for her province. Every month, she receives an updated expense report from head office, so she knows that her budget is underspent. There is no budget line for project team rewards or bonuses, so she decides to take money from the underspent repairs and maintenance budget line, and spend it on a big lunch for her project team. Her team are thrilled to go out to a nice restaurant, and they tell their colleagues in the other provinces about what their manager did for them.

The staff in the other provinces ask their managers if they are also going to be taken out to lunch like the staff in Mpumalanga. The other province managers inform their staff that project team lunches are not in the budget, but they will see how things look at the end of the year and see if they can do something nice. The staff are very unhappy, and feel that they are being treated unfairly by their province managers.

Required:

- Did Amanda act correctly as a province manager? Substantiate your answer.
- Did the other province managers act correctly? Substantiate your answer.
- What could happen to the project if more province managers followed Amanda's example?

7.6 QUALITY MANAGEMENT

In this section, you will learn about the importance of communicating and adhering to the project quality management plan. According to Lester (2017: 87), quality refers to 'the totality of features and characteristics of a product, service or facility that bear on its ability to satisfy a given need'. Quality management also ensures that your team uses resources to the best of their ability, without incurring waste or needing a lot of revisions (Wysocki, 2019: 13). It is important to remember that project quality management is a continuous process that is part of every stage of the project life cycle (PM4DEV, 2015: 3).

In this section, we will look at the different components of quality management, and how we would communicate differently for each component.

7.6.1 Communicating and adhering to the project quality plan

Project quality management is just as important as managing the project budget, scope and schedule. It is not enough to deliver the project on time and within budget. The client must be satisfied with the quality of the end result or project deliverables (PM4DEV, 2011: 4). There are three components to most project quality management plans. These are quality indicators, standards, quality assurance and quality control. Quality management refers to all the procedures, methods, tools, plans, controls, reviews and staff involved in the project (Lester, 2017: 89).

Quality indicators are used to provide the project team with clear and detailed indicators of quality at various stages of the project. Quality indicators define what is meant when discussing a high-quality product or service. They ensure that everyone is working with the exact same understanding of what is required (PM4DEV, 2011: 5). You want to avoid a situation where differences of opinion affect the project team's understanding of what good quality means to the project. That is why you, as the project manager, need to lead your project team through the process of unpacking and defining what the project quality indicators are.

An example of a quality indicator for the development and printing of a programme manual could be 'The programme manual is free from typographical and grammatical errors'. This is a clearly defined quality indicator that leaves no room for interpretation or matters of opinion. The programme manual content is either free from error, or it is not.

Project quality indicators typically refer to the following eight quality indicator categories (PM4DEV, 2011: 7):

1. *Functionality*: How the product or service is required to function.
2. *Performance*: How the product or service is required to perform.
3. *Reliability*: How reliable the product or service is required to be.
4. *Relevance*: How relevant or suitable the product or service is for the users' needs.
5. *Timeliness*: How efficient the delivery of the product or service is. This references the overall project schedule. It would be a failure of the project quality standards to deliver a high-quality product six months after the required due date.
6. *Suitability*: How suitable the product or service is for the intended users. If there is something wrong with the design or functionality of the product that makes it difficult for the intended users to use the product, you will have failed to meet the project quality standard.
7. *Completeness*: How complete the final product or service is. If your final product is missing key components or functions, you have not met the required project quality standard.
8. *Consistency*: How consistently the product or service performs. If the product only works nine times out of ten, then you have not met the project quality standard.

These quality indicator categories can help you unpack and write your own project quality indicators. However, you do need to be aware that certain products or services will not necessarily make use of all eight quality standard categories.

The second component of quality management is *quality assurance*. This refers to the structures, processes and tools put in place before project execution, in order to reduce or eliminate error, waste and mistakes. A helpful way to remember what quality assurance is about is to look at the word 'assurance'. To assure something is to promise or commit to a certain action. Your quality assurance plan is your plan to guarantee a high-quality product or service. It is your guarantee or confirmation of quality.

Quality control refers to the actual daily, weekly and monthly testing of the project quality, to ensure that the management plan is meeting quality standards (Lester, 2017: 88). Quality control differs from quality assurance in that quality control refers to the specific actions and tools used in a quality assurance plan to confirm or guarantee quality.

The act of physically checking each finished product to check for quality and writing down the findings is quality control. Your quality assurance plan sets out when the physical checking of each finished product will take place, who will do the checking, and how they will record what they find. The results of the quality control checks will tell you whether you need to make changes to your quality management plan.

The three quality management components have different purposes and, as a result, have different communication needs. They also occur at different stages in the project management life cycle. Quality indicators and quality assurance are necessary during the project planning stage, while quality control comes into play during the project execution stage (Project Management Institute 1, 2017: 275).

Communication, quality indicators and quality assurance

As the project manager, you need to ensure every member of your team fully understands the quality indicators or standards that will be used in the project. These are the standards the work has to achieve in order to successfully produce the project deliverables. Your team will also need to fully understand the quality assurance system being implemented to deliver the required quality standards. You would communicate this to your team during the project planning stage.

Communication and quality control

During project execution, your team should conduct daily, weekly and monthly quality control checks on the project activities and outputs. These quality checks will analyse the actual results, and compare them to the planned quality indicators (Project Management Institute 2, 2017). If there is a discrepancy, steps will need to be taken. Such steps may include the following (PM4DEV, 2011: 16):

- Identifying the quality issue
- Analysing the factors causing or contributing to the quality issue
- Developing possible solutions to the quality problem (it may be necessary to costs these, if they are complicated or require new machinery or software)
- Selecting a solution and making a formal decision

- Documenting the formal decision
- Informing the team about the changes being made to the project quality systems

If quality control results show that changes need to be made to the project quality management plan, the project manager will need to communicate with a range of people and in a number of different ways. For example, the project manager will need to communicate with (PM4DEV, 2011: 16):

- the project team when identifying and discussing problems with the project quality;
- senior project staff when analysing possible solutions to the quality problem;
- the finance manager, if there are budget implications in solving the quality issue (e.g. purchase of better quality equipment, or training staff in certain skills);
- the project team again, about changing the quality management plan, specifically focusing on the changes being made; and
- the project team going forward, as you monitor to see if the quality issue has been successfully resolved.

Remember that project quality management is a continuous cycle of checking, assessing, adjusting and monitoring to ensure the correct quality standards are achieved throughout the life cycle of the project (PM4DEV, 2011: 4). This means that information will flow back and forth between the project management and the project team. It is important to note that there is an information loop when communicating quality during project execution – there is communication feedback between the project manager and the team regarding the effectiveness of the changes to the quality management plan. Any changes made to the project's quality management plan and systems must be monitored to see if it improves the quality. It may be the case that two or three different solutions are implemented before you are able to find the best solution for your problem.

Changing the quality management plan

You should have a structured process in place to manage changes to the quality management plan. As is the case with making changes to the project scope and schedule, you need to allow for some flexibility, while at the same time preventing the team from making ad hoc changes on the ground.

You can develop a simple process modelled on the processes for scope and schedule changes (Meredith et al., 2017: 258).

Firstly, you will need to identify the quality issues that have the potential to affect the project deliverables. This information is most likely to come from your quality control records, or from your project team having observed a possible quality risk. Along with the project team, you will need to unpack and analyse the potential quality issue, assess the possible impact the quality issue can have on the project scope, deliverables and budget, and determine what is causing it and how it can potentially be resolved. Once you have this information, you can start looking at possible solutions to resolve the problem. There may be more than one possible solution. Each solution will have to be unpacked and analysed in terms of its likely impact in solving the identified quality

issue, costs that will be incurred if the solution is implemented, and possible effect on the project schedule and resources.

Once each possible solution has been reviewed, a formal decision needs to be made about whether or not there will be changes to the project quality management plan. If changes are made, these need to be formally documented, communicated to the client (if necessary), and communicated to the project team. All relevant project documents need to be updated to reflect these changes.

Quality management plan template

Here is a simple quality management plan template that you can use.

Quality management plan				
Quality standards (List and describe the quality indicators and how they will be measured)				
Project output	Quality indicators	Measurement tool	Measurement frequency	Person responsible
Quality assurance process (Describe the quality assurance process step by step across the project deliverables)				
Project deliverable	Project output	Quality assurance process		
Quality change requests (List the quality management change requests and the final decisions)				
Project output	Change request description	Impact on project	Final decision	

(Source: EDGE Learning Media (Pty) Ltd, 2020; adapted from Dionisio, 2017: 97–98)

Figure 7.6: Quality management plan template

Let's look at our young offenders programme again to illustrate how changes to the project quality management plan are managed.

EXAMPLE 7 E (Project quality changes)

The young offenders programme has been running for seven months at all six locations. During the planning phase, you developed a project quality management plan that included quality issues on programme compliance. This referred to the extent to which the young offenders attended and participated in the programme and fulfilled their sentence. Your project quality management plan contains the following information regarding quality standards, quality assurance and quality control.

Quality standard	Quality assurance	Quality control
At least 98 per cent of all sentenced young offenders complete all programme sessions.	Data on intake and attendance will be assessed and reviewed every month.	Monthly programme attendance reports to be signed by the site manager. All monthly programme reports to be signed by the project manager.

(Source: EDGE Learning Media (Pty) Ltd, 2020)

Table 7.5: Project quality management

You are required to provide reports to the participating courts on the number of offenders referred, programme attendance rate and programme drop-out rate. Your programme statistics for month seven are as follows.

Indicator	Number	Percentage
Number of offenders referred	400	100 per cent
Number of offenders who attended all programme sessions	290	72.5 per cent
Number of offenders who dropped out or did not attend all programme sessions	110	27.5 per cent

(Source: EDGE Learning Media (Pty) Ltd, 2020)

Table 7.6: Programme statistics

The magistrates inform you that they are very concerned about the 27.5 per cent of young offenders who are not fulfilling their sentence, as they have not attended all their required sessions. They request weekly status reports in order to monitor the young offenders in the programme who have missed two or more sessions.

This requires you to make changes to your quality management plan. Instead of monthly programme attendance reports from your project team, you will now need weekly reports. You will also need to report to the courts in such a way that makes it simple for them to see which young offenders need to be brought back to court for breaching their sentencing conditions. This means that changes need to be made to the format and content of the weekly progress reports.

You communicate this change to your project team, and develop a new weekly programme attendance report that lists all the young offenders in programmes, the number of sessions they attended, and the number of sessions they missed.

In other words, the quality indicators, quality assurance and quality controls have now been adjusted. These changes are reflected in the revised quality management plan shown in the following table.

Quality standard	Quality assurance	Quality control
At least 98 per cent of all sentenced young offenders complete all programme sessions.	Data on intake and attendance will be assessed and reviewed every week. Weekly programme attendance reports to be submitted to the courts, highlighting all young offenders who have missed two or more sessions.	Weekly programme attendance reports to be signed by the site manager. Site manager to consolidate weekly reports into monthly reports. All monthly programme reports to be signed by the project manager.

(Source: EDGE Learning Media (Pty) Ltd, 2020)

Table 7.7: Quality indicators, assurance and controls

This example illustrates how it may be necessary to make changes to your project quality management plan based on the feedback you receive during project execution. Your role as the project manager is to maintain a structured process that prevents people from making ad hoc changes to the quality management plan, while still being flexible enough to incorporate necessary changes.

Having a clear a structured process to follow when making quality management plan changes, and a set process for communicating those changes to the project team, will ensure everyone is on the same page, and that improvements are being incorporated throughout the project life cycle. This approach allows for continuous improvements to be made during project execution (PM4DEV, 2011: 19). This balance between structure and flexibility is one of the main challenges that project managers face.



EXERCISE 7D

Quality management

Bright Bulb is a new business that teaches young people between 14 and 16 years old how to start and run their own business through a small, simulated business exercise. The programme is being run at schools in Pretoria, Durban and East London. The schools pay R 3 000 per learner to attend the programme.

The staff in the three provinces receive all the programme materials and manuals in a kit. The kit includes learner workbooks, posters, a facilitator guide and games. The programme is 60 per cent theory, and 40 per cent games that are based on the theory. All the staff have been trained on how to run the Bright Bulb programme.

Debbie is the staff member in Durban responsible for running the Bright Bulb programme in the area. She manages the programme in three schools. She does not really like the programme material, as she thinks it is too complicated for young teenagers. She thinks the materials are more suited for young adults with more education. She decides to make changes to the programme materials, and writes her own manual with less theory and more games. The feedback she gets from the children in her programme is positive, as they like playing more games. Debbie's programme is now 40 per cent theory and 60 per cent games based on the theory. She uses the same programme evaluation tools as the rest of the staff use. Debbie does not tell the project manager she has made these changes.

Required:

- (i) Has Debbie acted correctly? Substantiate your answer.
- (ii) What impact will Debbie's actions have on the project as a whole?
- (iii) What could Debbie have done differently?

7.7 PROJECT MANAGEMENT IN PRACTICE

The following case study illustrates the importance of proper project management control for scope, schedule, budget and quality, and what the consequences are if these are not in place.

Background

A major international company, of which the head office is in Cape Town, South Africa, has decided to invest R 6 million into youth empowerment, specifically focusing on creating income-generating opportunities for the youth. This may be formal employment, small business development or casual freelancing.

The project has a pilot phase (first 12 months) and a second execution phase (next 12 months).

For the first 12 months of the project, there is no project manager. There are no clear roles and responsibilities mapped out within the project team, and there is no clear project plan and no existing monitoring and evaluation framework. There is also no quality management plan.

Meetings

The project team has a basic idea of what is required, drawn from the project proposal. Each week, they decide what they will focus on, and report on their focus at the next week's team meeting. They feel that this informal approach allows for greater creativity and innovation. The client strongly supports this approach, saying it is innovative and adaptive, and ensures the youth project is driven from the ground up (by junior staff), instead of being imposed from the top down (by senior management onto the junior staff).

At these weekly project meetings, a general routine is followed:

- Discuss challenges
- Decide upon actions
- Report on the activities completed to date

The team members take turns chairing the weekly meeting, as there is no project manager. The chair is expected to type up the meeting minutes and send them out to the team. This rarely happens, and results in poor continuity between meetings in terms of the following:

- Following up on outstanding work from the previous week
- Tracking progress
- Keeping track of decisions made
- Assessing the impact of suggested solutions

Attendance at these meetings is not 100 per cent every week.

Communication

Team communication is difficult. Most of the project team members are very young and inexperienced, and are not comfortable with long and detailed emails, but prefer to communicate via WhatsApp. They rarely check their emails, and when they do, they do not read the lengthier and more complex business communication emails. As a result, they are often unaware of decisions made between the weekly meetings.

A further complication is that there is no central repository of information.

Partners

The project has one partner, an NPO that is expected to deliver some of the project aspects as follows:

- Designing and developing the life skills and small business skills programme
- Placement of youth in work opportunities
- Monitoring of the impact of the project against the targets of 700 youths entered into employment within 12 months of project start date

The project partner holds a basic memorandum of understanding (MOU) in place of a contract. However, this MOU does not contain specific details on deliverables, or a time frame.

The client is the only person in the team who has the authority to take action with the project partner in terms of delivery. The client attends the weekly meetings, but does not assume the role of a project manager. There is no one person who is coordinating and managing the project processes, activities and outputs. Each team member is managing their own tasks on a week-to-week basis.

Budgets

There are numerous changes to the project scope and schedule. Every week, new activities and tasks get added to the weekly work list. The client has the project budget, but is not monitoring expenditure against budget lines.

Status

At the end of the pilot phase, 12 months after project kick-off, the status of the project is as follows:

- The project budget is highly overspent in key areas. There are a lot of questions about the accuracy of the expense report in terms of how invoices were allocated to the project budget line.
- The target of 700 youth entered into employment has not been reached.
- The life skills and small business skills programme manuals have not been completed. The site teams have been using draft versions to deliver programmes, or using material they found on the Internet.
- Staff training and orientation is unstructured and ad hoc.
- The quality of the youth programme varies between the different sites.
- There is no up-to-date data available on project performance. As a result, the site managers have to submit manually calculated statistics for the client progress report every month.
- The project impact statistics are inaccurate and unreliable.

You are approached by the company to advise them on structuring and planning the next project execution phase. You want to ensure that the problems that occurred during the pilot phase are not repeated during the second execution phase.

Required:

You are responsible for coaching the client to prevent this from happening again. Write a brief that you will discuss with your client as part of your efforts to improve their performance. Your brief must be no less than 1 000 words, and must provide an analysis of each of the following areas:

- Scope management
- Quality management
- Financial management
- Schedule management
- Overall project management

7.8 SUMMARY

In this unit, we covered the management of the project budget, scope and schedule, and quality plans and processes.

The most critical takeaway from this unit is that changes are necessary during project execution, and these changes must be managed in a structured way, so as to avoid negative impact on the project budget, scope and schedule. Your project team must understand that they cannot make ad hoc changes to the project that may impact the project schedule, quality, scope and budget. If they see the need to make changes, these suggestions must undergo analysis and review to assess the impact these changes could have.

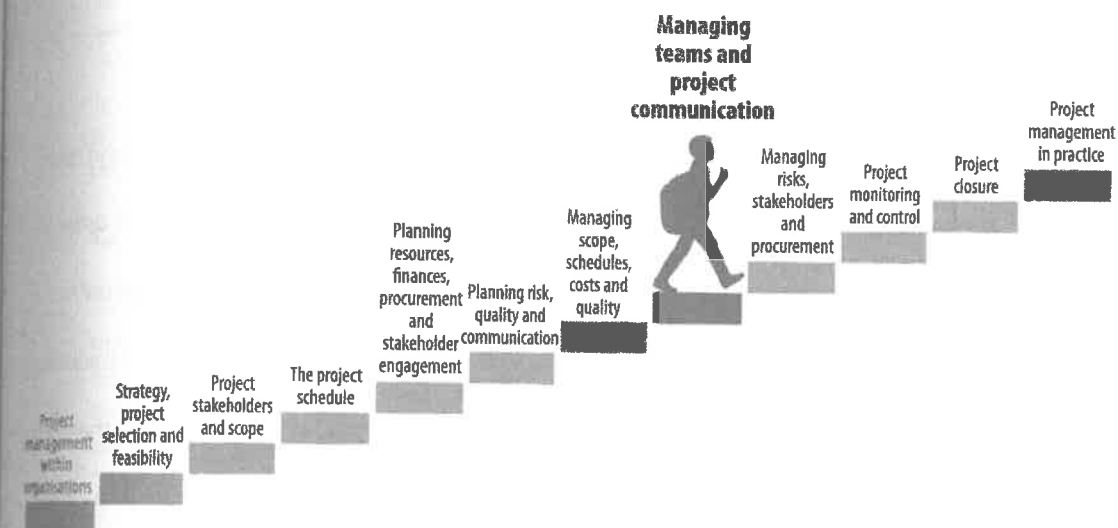
At the same time, you need to avoid a rigid and inflexible approach to project management, which does not take issues that emerge during execution into account.

Having regular structured reviews and established processes for considering possible changes is best practice for managing changes. You must also ensure the team is aware that changes have been made, and that the updated project documents are available in the shared repository. You also cannot assume that your team will read the updated documents: you need to take decisive steps to ensure that everyone is briefed on the changes, and the impact these changes will have on the current project processes.

8

MANAGING TEAMS AND
PROJECT COMMUNICATION

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8.1 INTRODUCTION

ABC Corporation has recently employed a new group of employees. For the majority of the new employees, this is their first or second job. ABC Corporation is a large company with various business divisions, and it is therefore important that the new workers do not feel overwhelmed. To this end, the human resources (HR) department has put together an onboarding guide for both the employees and the managers and other staff who will lead them through the two-week process. The new employees will not start their duties immediately. They first need to understand how and where they fit into the company and how their work will contribute to the success of the project they have been appointed to.

After studying this unit, you should be able to:

- explain various strategies for creating and onboarding a project team;
- critically evaluate the role and importance of forming, storming, norming and performing in project team development;
- produce a team charter;
- gauge the central importance of communication in project management;
- identify the key attributes of effective project communication, as well as the barriers to effective communication;
- critically evaluate the importance and types of project meetings;
- apply established methods for dealing with conflict;
- discuss the impact of culture on team management;
- appraise various collaboration techniques for project teams; and
- apply your knowledge of project-execution processes to both fictional and real-life cases and scenarios.

8.2 KEY TERMS AND DEFINITIONS

The following key terms and definitions are applicable to this unit:

- *Cohesion*: The behaviours and strategies that foster a sense of community among team members – the so-called 'togetherness' among people.
- *Collaboration*: When team members and relevant stakeholders work together in order to achieve a common goal.
- *Communication barrier (noise)*: Any sort of hindrance to communication, such as actual noise or cultural and personality differences.
- *Communication quotient (CQ)*: People's ability to communicate effectively with one another (Harrison, 2005).
- *Compliance*: The first stage of onboarding, in which employees learn the boundaries that they are to operate within with regard to policies, rules and regulations.
- *Conflict*: Disagreements between team members; usually stems from miscommunication, differences in perspectives, or perpetual high-stress environments.
- *Cultural intelligence*: A deep knowledge and understanding of various cultures, as well as how to integrate them into the project environment with as little conflict and miscommunication as possible. This may also refer to strategies and behaviours that the project manager can foster in themselves or their team in order to encourage greater diversity in the workforce.
- *Onboarding*: Inducting new employees into a company to familiarise them with the knowledge, skills and behaviours required.
- *Project objectives*: Principal guidance for teams; a stated definition of what is regarded as a successful outcome for teams.
- *Storming*: A stage of team development where team members may be more comfortable expressing themselves; this may lead to conflict and competition as individual personalities emerge.

8.3 GETTING THE TEAM TOGETHER

When we think of project management, we normally think of planning timelines, budgets and project operations and processes. However, the lifeblood of a project is the people who make up the project team. The skills and expertise that they bring to the team and the synergistic interactions that team members have with each other ultimately determine how successful an organisation will be in achieving the project outcomes.

To ensure the highest probability of success for a project, we need to fully understand what is required to achieve success. The size and scope of the project largely dictates the composition of the project team, and it is important that the project team you assemble reflects this. Knowing what size the project team should be and the skills and knowledge that will be required ensures that the right people are brought onto the project team and that project processes are conducted efficiently.

Assembling the project team is just the first step in the process of forming a productive team. Onboarding of project members is a critical step for ensuring that all members of the project team

are on the same page and that all members work together toward common project goals, and not against each other. A talented team has no guarantee of success if effective communication channels have not been established between members of the project team, or if there is ambiguity regarding their roles and responsibilities. To get the most out of your project team, you need to successfully integrate all members into the project environment and provide all the necessary information and training they will require to reach that point.

8.3.1 Getting the team you want

The first step in getting the team you want usually starts with identifying the core tasks that will need to be handled. Core team members will form the backbone of your project team, and will be relied upon to provide stability to the project by handling their duties reliably and effectively. To aid in identifying the core tasks, and how to structure a team to cover all these tasks as efficiently as possible, the following key questions should be asked and answered:

- What technical skills are required? Which individuals possess these skills?
- What non-technical skills are required? Are there individuals who have these skills and can present unique benefits to the project team?
- Are there any political or social factors that need to be considered when forming the team?
- Would the inclusion of certain individuals provide some kind of benefit to the project, such as increased credibility or visibility?
- Who would be responsible for providing access to information and other resources?
- For each potential team member, what is their track record as a team player? Each team member needs to be assessed with regard to whether they will operate synergistically with their co-workers.
- What is the ideal size for the project team?

Based on the scope and size of the project, and with the knowledge of the roles that need to be filled, it is also important to assess the size of the project team. A project team that comprises too many members will be plagued with bloat and redundancy, and likely a general sense of chaos, while a team with too few team members could lead to frustration and burnout as team members desperately scramble to cover all bases without having the resources to sustain this activity over the long term.

Sometimes projects are expanded in scope or scale, and it may be difficult to manage a large project team. In these situations, sub-teams should be created, where team leaders or representatives act as neutral external facilitators for each of the core aspects of the project. Initial meetings should be conducted for each of the sub-teams and then the representatives of each team should attend the main meeting to provide feedback on project progress and operations.

You will not always have the perfect team, and often you will have to make accommodations, or approach some team members differently. Regardless of the quirks some team members may possess, a happy team will always operate with unified respect if the right environment and culture are promoted. A simple question team members usually ask themselves when assigned to

a project team is: 'What's in it for me?' You need to be ready to answer this question for each team member. How can your project benefit team members? Does each individual want to:

- solve challenging problems?
- be recognised for their contributions or talents?
- grow as a professional by learning and gaining new skills?
- apply their technical expertise?
- be stimulated by new and different tasks to provide some refreshing variety to their standard duties?
- accomplish something of importance?
- attain rewards (perhaps financial incentives)?
- work with people from different specialisations or departments within the organisation?

It is not only important to ask these questions of your team members, but also of yourself. As the team leader, you should lead by example. If you are not motivated, then you cannot expect your team to be motivated either. You need to identify what you can gain from the project as well. Projects can run for long durations, so it is important for the project manager to stay motivated in order to create a positive environment that will keep the team energised and focused throughout the project life cycle.

8.3.2 Onboarding the team

Onboarding is the process of integrating team members into the project environment. Team members need to understand the project culture and be equipped with all the tools and information required to develop into a productive member of the project team. Onboarding is not merely a type of orientation. It is a strategic process that can last as long as a year, and is crucial for ensuring team-member retention for the duration of the project (Maurer, 2015).

Finding the best people for your project team is only the first step in developing an effective team. Team members may possess all the required skills and talents to guarantee project success on paper, but we still need to ensure that each team member is both productive and happy if we are to translate success in theory to success in reality (Maurer, 2015).

There are some key questions that can assist you in developing an onboarding strategy:

- When will the process commence and how long will it run for?
- Is there a specific impression to be conveyed to the incumbents at the start?
- Are there specific things that the new staff members must be made aware of regarding the work culture?
- To what extent do the manager, team leader, team members and HR department have responsibility during the process?
- How will individual expectations for the new team members be communicated to them?
- What method will be used to gather feedback regarding the onboard – to ascertain the level of access and whether it should be changed or improved upon?

Answering these questions can greatly aid the project manager in devising a core strategy upon which to base a formal onboarding programme. This programme can then efficiently assimilate new members into the project team by getting them up to speed with organisation policies, the project culture and its workflow (Maurer, 2015).

Bauer (2010: 1) states that 'half of all senior external hires fail within the first 18 months in their new position' and 'half of all hourly workers leave new jobs within the first 120 days'. This highlights the importance of onboarding and the retention of new team members. It is generally accepted that employees have about 90 days to prove themselves in a new job.

Having an effective onboarding process in place will allow new members to acclimate to the project environment quickly, and begin to contribute toward the project goals. Onboarding is said to have four distinct levels, often referred to as the four Cs (Bauer, 2010: 2):

1. *Compliance:* This is the first level. Employees know the boundaries that they are to operate within with regard to policies, legal rules and regulations.
2. *Clarification:* This ensures that new employees understand the responsibilities of their new job and what is expected of them.
3. *Culture:* This broadly refers to the formal and informal norms within the organisation.
4. *Connection:* This refers to the vital interpersonal relationships and communication networks that must be established to ensure the successful integration of new team members.

The objectives of the first day of onboarding should be to set expectations and introduce project goals. New members need to have a clear understanding of their tasks and responsibilities. Along with this, it is also important that project roles and responsibilities are outlined for the entire team, to allow current employees to understand where new members will fit into the team. Existing team members may feel threatened if they think that new hires will take over their responsibilities, so it is important that the interaction of team members and their responsibilities are clearly understood (Maurer, 2015).

Social integration of new members into the project team is essential. Introduce new hires to their colleagues, take them out to lunch, and make them feel welcome. It is human nature for people to feel uncomfortable in new environments. You want to 'break the ice' as it were, and make it known to new members that they are now part of the team (Maurer, 2015).

First-month check-ins are common practice to ascertain whether new employees are happy and comfortable, and if they are successfully integrating into and engaging with their team. It is therefore important that the new hires' functions are clearly communicated to them and, where necessary, that they are equipped with the required training as early as possible. It is common practice for this to take place during the first week, but it is also important not to inundate new members with too much information at the outset. You want to bring new team members up to speed as fast as possible so that they can function as a productive member of

the team, but to do this you need to provide a manageable flow of on-the-job training (Maurer, 2015).

Having a mentor to guide a new employee can be vital for successfully integrating new team members. Incorporating a mentoring programme for new employees may involve assigning a new employee to a 'go-to' person, or even having a variety of people available who can be called upon for any questions that new hires may have (Maurer, 2015).

Most employees will decide whether they want to leave or stay at a company within the first six months. Performing an additional check-in during the first three to six months to ensure that new employees are still happy and comfortable can have a huge impact on the retention of employees over this period (Maurer, 2015).

The one-year mark is where the onboarding process ends and the focus shifts to retaining employees, if they have performed satisfactorily. The annual performance of new employees is assessed at this time, as is the performance of the onboarding strategy. Ideally, new members will have integrated into the team as productive members and their future development within the organisation can be discussed. On-the-job training now shifts to continuous development. Communicating the path ahead for the coming year helps to motivate employees, and it is also a great time to discuss their compensation moving forward (Maurer, 2015).

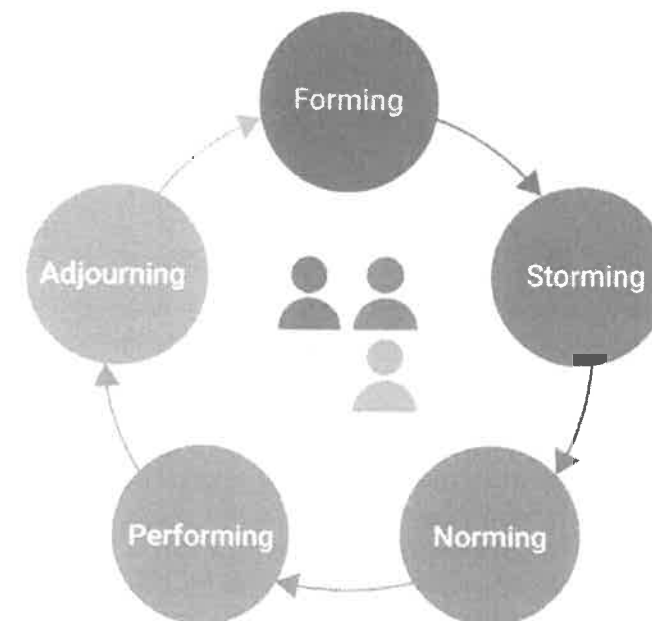
? EXERCISE 8A

- (i) When assembling a project team, you must identify the core tasks that need to be completed. There are also some more nuanced aspects involved in team assembly. What are some of the key questions that can be asked to assist in forming the best possible project team?
- (ii) Discuss the motivations you could offer to people you want to bring onto a team, considering 'What's in it for me?' is a question someone may ask when requested to be part of a project team.
- (iii) Explain why onboarding plays an important role in the success of a project.

8.4 DEVELOPING YOUR TEAM

Team development is a complex, but essential, part of project management. This section will discuss the five stages of team development: forming, storming, norming, performing and adjourning. Team development also involves developing team charters and implementing techniques and protocols that will help to develop the team into a well-oiled, high-performing unit.

The team development process



(Source: EDGE Learning Media (Pty) Ltd, 2020; adapted from Project-Management.com, 2018)

Figure 8.1: The cycle of team development from forming through to adjourning

8.4.1 The stages of team development

An effective project team will not exist from the moment of its inception. For the team to operate effectively, the people that comprise the team need to be able to work together to collectively contribute toward the project outcomes. This process of learning how to work together over time is referred to as 'team development'. In 1965, educational psychologist Bruce Tuckman described the procedural process of team development in four stages. He referred to these stages as forming, storming, norming and performing. Twelve years later, together with the contributions of Mary Ann Jensen, a fifth stage was added to the tail end of the stages of development: adjourning (Project-Management.com, 2018).

Stage 1 – Forming

The first stage of team development is forming, which may be seen as a time of team orientation. After all the introductions have been completed, new members will be noticeably reserved and polite, as is human nature in new company. However, the project manager should use this opportunity to provide structure and direction to clear up any uncertainties that team members may have. The skills, backgrounds and interests of team members should be discussed, and

the objectives, associated timelines and ground rules of the project should be communicated (Project-Management.com, 2018).

As the group begins to familiarise themselves with everything, roles and responsibilities can be assigned. It is important that the team leader assists in this regard, and helps to establish how team members will work together ('team norms'). It is expected that the team will not be very productive at this stage of development, as this stage is more focused on putting the right structures in place and getting everyone accustomed to their roles in the project environment (Project-Management.com, 2018).

Stage 2 – Storming

The stage that follows is known as the storming stage, and this could be considered the most difficult and critical stage of development that needs to be overcome by the project team. By this stage, members of the project team are likely to be more comfortable expressing themselves and, as a result, this period will be marked by conflict and competition as individual personalities emerge. Team members may disagree regarding project strategies and tactics, and factions may actually form around strong personalities or areas of agreement. It is vital that the project manager displays strong leadership during this time by providing a structured approach to areas of contention and clear guidance in these matters. An environment that promotes effective communication needs to be fostered, whereby all team members are given space to express their ideas and differences in opinion. One or two vocal members may not control all conversations. It is a good time for the team leader to identify members of the team who need to be coached to be more assertive in team discussions, and those who need to learn to be more effective listeners (Project-Management.com, 2018).

If this stage of development is to be overcome, team members will need to work together to resolve conflicts and differences in opinion, and accept that individual differences will occur. The project manager needs to lead by example in this regard, and provide effective conflict-resolution measures when required. Failure to deal with conflict and animosity within the project team will result in long-term issues. Low morale and a lack of motivation can lead to poor productivity or team members leaving, which can cause the project to come to a halt or even completely fail (Project-Management.com, 2018).

Stage 3 – Norming

The norming stage is where members of the team begin to work more effectively as a team, instead of focusing on individual victories. With the right work culture instilled and procedures in place for resolving conflicts, differences in opinions become a strength rather than a weakness, providing a wide range of insights regarding potential solutions to problems. Additionally, this means that instead of individual team members making decisions they are uncertain about, they will now be more comfortable with consulting other members of the project team for advice and assistance. As a result, an increase in productivity and team morale will be observed as trust and unity between team members grow (Project-Management.com, 2018).

At this stage, the project manager can become less involved in direct decision-making and problem-solving. Team members start working together to achieve project goals and can be given more responsibility. The team leader will, however, still need to remain vigilant, as there will be occasions where guidance may be required; for example, when consensus cannot be reached, or where conflicts cannot be resolved between team members using the procedures that were initially put in place. The project manager thus takes on more of a coaching role, whereby they ensure that team members continue to work collaboratively toward project goals (Project-Management.com, 2018).

Stage 4 – Performing

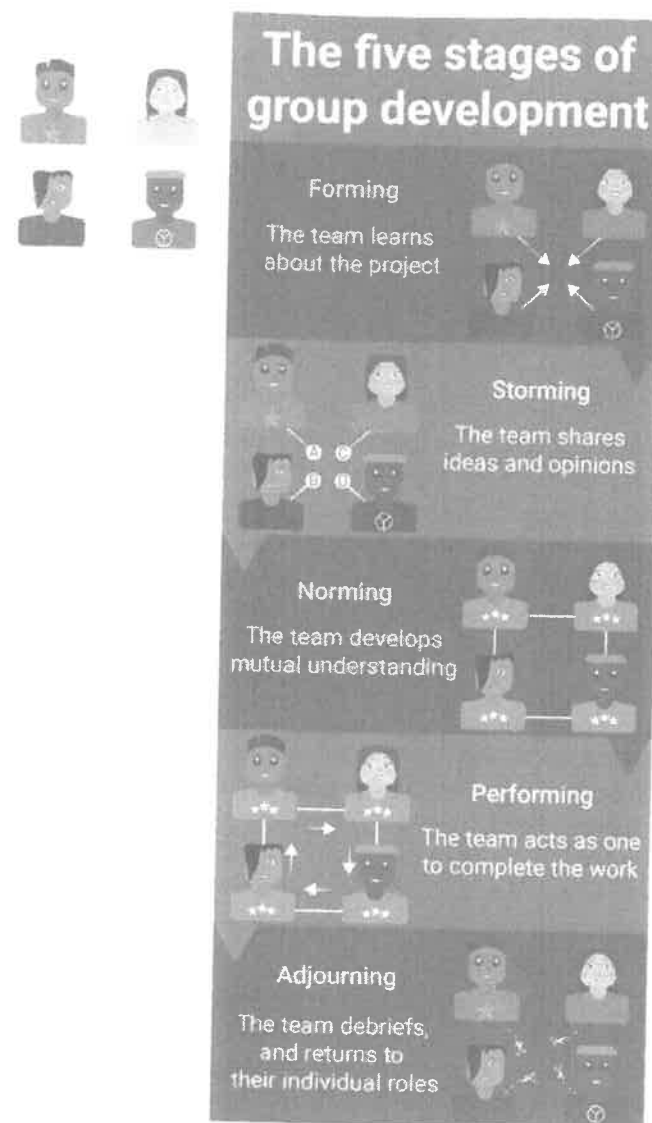
When teams enter the performing stage of development, they should be functioning at their highest levels of productivity, as they fully trust each other and are focused on achieving project goals as a group rather than as individuals. Performing teams can function without oversight from the project manager and team members operate interdependently. The team is highly motivated to complete project tasks and can make decisions and solve problems swiftly and effectively. In the event of disagreement, team members can work together to reach an acceptable consensus without affecting the progress of the project and, where change to project processes may be required, the team can be trusted to come to an agreement and implement the changes without relying on the project manager (Project-Management.com, 2018).

By this stage, the project manager should not be involved in day-to-day decision-making and problem-solving, but instead be responsible for monitoring the team's progress and providing recognition by celebrating milestone achievements with the team to continue to build morale. The team leader will therefore only be involved in higher-level decision-making within the organisation and, instead, delegate some of the leadership responsibility to the project team (Project-Management.com, 2018).

It is possible for the team to revert back to the norming stage or storming stage if any of the members start working independently rather than with their team. In the event that new members join the project team, it is even possible that the project team will revert back to the forming stage. If this occurs, the project manager and the rest of the team should work together to reignite the productivity of the performing stage (Project-Management.com, 2018).

Stage 5 – Adjourning

Once the project objectives have been achieved and team members begin to move off in different directions, it is a good time for the project manager to celebrate the successes of the project with the team. More importantly, it is a time for evaluation. The adjourning stage is not necessarily reached only when a project succeeds, but also when it fails, and so it is important that this time is used to review the team's performance and identify opportunities for improvement (Project-Management.com, 2018).



(Source: EDGE Learning Media (Pty) Ltd, 2020)

Figure 8.2: The stages of team development

8.4.2 Developing a team charter

Team charters are documents that define the objectives for the team, their operations, and the expected outcomes. Simply put, a team charter acts as a road map for the team and its sponsors to provide clear direction throughout the project life cycle (Mind Tools, n.d.). In the previous section, we learned about the stages of team development (forming, storming, norming, performing and adjourning). Here, a team charter functions as a supplementary tool to fast-track

team development and aid in combatting the common stumbling blocks associated with team development. Some benefits that a team charter may provide include the following (Smartsheet, n.d.):

- Buy-in from members regarding the project objectives – especially resistant members who exhibit scepticism or pessimism
- A statement which stipulates that all members of the project team, including leadership, are accountable to the same set of principles
- A clear definition of the roles and responsibilities of all team members
- An outline of project operations, including task ownership, risk strategies and contingency plans
- A statement of the team's mission that ensures transparency is provided to other individuals within the organisation
- A clear strategy to deal with conflict scenarios within the project team

For a team charter to be effective, it should be drawn up during the forming stage. It is common for team members to be excited during the forming stage and to want to fully engage in project operations. However, it is important that everyone is on the same page and has a clear understanding of the project priorities, so that they can work together as a team to achieve the correct project outcomes and use the available resources as efficiently as possible (Mind Tools, n.d.).

Structure

There is no specific structure to a team charter, as the structure will largely depend on the nature of the project. Common elements that will generally feature in a team charter include (Smartsheet, n.d.):

- background;
- project objectives;
- roles and responsibilities;
- budget and resources;
- internal checks, balances and reviews; and
- assessment and evaluation.

A *background element* provides some context regarding the origin of the team and the environment in which it will exist. The composition of the team is briefly described and some detail is provided regarding what value each member of the team contributes, including identification of the team leader and chain of command. The needs and expectations of key stakeholders are also outlined in this section (Smartsheet, n.d.).

The *project objectives* act as the main guidelines for all team activities. The definition of success needs to be clearly defined in a measurable way and the key role that the team plays in achieving this success must be stated. A mission statement may also be included to promote a value

proposition or work culture. The inclusion of interim deadlines and milestones help to evaluate project progress and performance (*Smartsheet*, n.d.).

A detailed breakdown of the *roles and responsibilities* of all team members imparts a clear overall picture of what tasks can be assigned to existing teams, and assists in identifying expertise gaps that need to be filled. The organisation will therefore be able to make a more informed decision regarding whether to incorporate new team members or use external third parties to make up for any process gaps that need to be filled. An RACI (responsible, accountable, consulted, informed) matrix of roles and responsibilities can be used to outline the degree of responsibility that each team member has in terms of the various project tasks (*Smartsheet*, n.d.).

The *budget and resources* section is generally approached using one of two methods. The top-down method makes use of a provided budget and decides how best to allocate it among the various processes and tasks in the project. The bottom-up method is more time-intensive and requires that the team identify budget and resource needs for the various project processes and put forward a budget proposal. It is a much more strategic and efficient approach, but can only be used in the absence of time constraints (*Smartsheet*, n.d.).

A section that covers the *internal checks, balances and reviews* is very important in achieving a high-performing team. Using a system such as SMART (specific, measurable, achievable, realistic, time-based) will help in setting up realistically achievable tasks and goals, where the performance of team members can be measured in comparison to the estimated deadlines. A system such as this also creates an environment of accountability and removes any element of confusion with regard to responsibility ownership or target metrics (*Smartsheet*, n.d.).

A section detailing team member *assessment and evaluations* can be a powerful tool for getting the most out of team members, if implemented correctly. Regardless of whether this involves annual or monthly reviews of team members, and in addition to the standard assessment and evaluation of each member, it is an important opportunity to receive feedback from each individual about themselves, their peers, and even the team leader's performance. The function of team member assessment and evaluation should be to help them identify areas of weakness where they can improve in a constructive manner, rather than to scold and shame. Finally, this is also an opportunity to praise team members on their successes and achievements (*Smartsheet*, n.d.).

8.4.3 Creating a high-performing team

High-performance teams are key to reliably and effectively achieving project outcomes. However, there is more to a high-performance team than just being productive. An experienced, highly capable team can be very productive on ordinary days, but how they react when an unexpected challenge arises determines whether a team earns the distinction of being 'high performance' (*PM Tips*, 2009). The model that follows depicts the three primary components in a high-performance team: a positive team environment, collaborative problem-solving, and leadership.



(Source: EDGE Learning Media (Pty) Ltd, 2020; adapted from *PM Tips*, 2009)

Figure 8.3: The elements of a high-performance team

Positive team environment

In order to facilitate a positive environment, ground rules need to be established to explicitly state the expectations of each individual, both in terms of work ethic and the culture of the project team and, to a larger extent, the organisation. With these ground rules in place, a team identity can begin to form, based on the commitment of all members of the team to achieving common goals. This commitment relies on clear project goals and scope, demonstrated support from project sponsors, and understanding the value each team member contributes (*PM Tips*, 2009).

When confronted with problems, the project team may need to devise a plan of action, and in order to effectively generate and assess potential solutions and strategies, effective communication is vital. An environment in which members are able to provide input, and all other members give that input due consideration, will enable the project team to identify and implement optimal decisions to problems that arise (*PM Tips*, 2009). A positive team environment will also promote personal ownership of the team goals. When the success of the team becomes a matter of personal and professional pride, team members will have a much higher degree of motivation and determination in their work, allowing for the development of a high-performance team (*PM Tips*, 2009).

Collaborative problem-solving

Collaborative problem-solving is important if the project team is to efficiently deal with problems that arise. The primary requirement for this is the establishment of a problem-solving process. The

team must agree on a suitable process that they will follow to deal with problems. By creating an agreed-upon, structured set of guidelines within which problem-solving must occur, there is actually a larger degree of freedom in approaching the problem, because each member understands and believes in the process (*PM Tips*, 2009). However, the project manager needs to understand that not all decisions should be made in this way. Some decisions should be made solely by the project leader, or even by a subgroup within the project. The team needs to understand the possible decision modes, and where each mode is most applicable (*PM Tips*, 2009).

Generating the best possible solutions to problems requires that team members have creative freedom. This freedom may result in more disagreements, and in order to prevent these disagreements from hampering the problem-solving process, strong conflict-resolution skills are necessary (*PM Tips*, 2009). For a project team to operate with and maintain high performance, continuous learning is a fundamental requirement. The members of the project team need to be able to learn from both successes and failures if they are to continually improve (*PM Tips*, 2009).

Tying all of these factors together is the leadership of the team. The project manager has to lead by example. It is not often that team members will rise above the level of energy, attitude and commitment the team leader displays. As a result, the performance of the team is almost always dependent on the performance of the team leader. Team leaders need to demand accountability from their team members, and from themselves (*PM Tips*, 2009).

Team members mainly focus on the short-term outcomes of the project, while the project manager focuses on the final outcomes. The team leader must ensure that team members approach their short-term goals in the context of the overall goals of the project by maintaining and communicating the strategic vision of the project. Project management tools, such as the statement of work and the work breakdown structure (WBS), can provide much assistance in this regard. High performance can be achieved by many teams, but the catch is whether the team can maintain that level of performance in the long term. To guarantee the longevity of a high-performance team, the health of the team must be considered. Every project task is measured by producing a quality deliverable in time and within budget, but the metrics of team health are often overlooked.

Does the team atmosphere foster learning, creativity and team unity? The team leader should dedicate time and resources to monitoring the health of team members. The members of the team are all human beings with feelings, egos, non-work interests, obligations and career goals beyond the scope of the project. The personal performance of each team member will vary according to their motivation, confidence in project leadership, and the respect with which they are treated. When someone goes above and beyond their duties, acknowledge their efforts. Do not let employees work themselves to the point of burnout, and always treat them with respect.

8.5 COMMUNICATION

Understanding *how*, *what* and *when* to communicate with your team is essential to the success of your project and the morale of your team. This section discusses the importance of communication, barriers thereto, and techniques for effective communication in a team.

8.5.1 The importance of effective communication

Effective communication is one of the most desirable non-technical skills in the modern workplace (*Forbes*, 2019). There are various reasons for this. Chief among them is that as a project manager – or even a team member – you will spend a lot of time communicating with any number of project stakeholders. Previous units will have stressed various aspects of communication, such as stakeholder engagement and procurement plans. However, effective communication underlies *all* aspects of a successful project. Virtually every element of a project plan needs to be communicated to someone in a clear, unambiguous and timely manner.

Poor, improper or ineffective communication underlies any stress that may occur in the project team or with project stakeholders in the following ways:

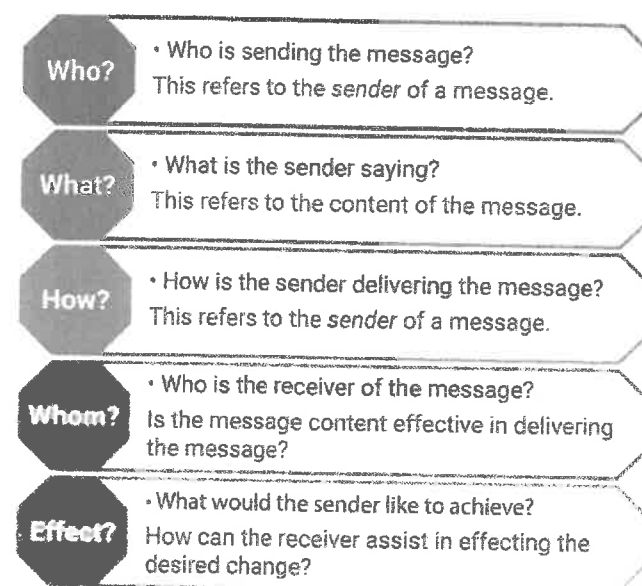
- **Schedule:** If neither your team members nor the relevant stakeholders are aware of which tasks need to be completed when, or when the project is scheduled to be completed, it will create confusion and frustration. They will not know what to expect of the project or which tasks they are expected to complete. For example, if a downstream activity is scheduled to start on 30 March, but the upstream activity is only scheduled to be completed by 15 April, not communicating this with the team members will create friction between the teams responsible for these tasks.
- **Responsibility:** As you can imagine, if team members or stakeholders are unaware of who is responsible for which tasks, resources or project domain, misunderstandings and confusion will be plentiful.
- **Resources:** Proper communication regarding the assignment, availability and location of resources will ensure the project proceeds smoothly, since all relevant team members and stakeholders can find the resources they need – as opposed to milling about trying to find resources that may be over-utilised, not yet available, or just not where they are supposed to be.
- **Budget:** Transparency regarding the budgeting of the project will ensure that unethical practices, such as padding or embezzling, are avoided. If project members and stakeholders are aware of how much money has been allocated to their tasks or responsibilities, they can plan accordingly.
- **Morale:** Morale is rarely tied to a single area of responsibility. Rather, it is a phenomenon that emerges from many areas of the project at once. However, one of the easiest ways to ensure good morale among project stakeholders is to employ clear and effective communication. This avoids unnecessary frustration caused by delays, unavailable resources, scheduling problems, project cancellations, mismatched scopes or requirements, or a product that no one wants. Poor morale also has a 'knock-on' effect; for example, if the project is behind schedule and this affects morale, the poor morale could affect the project schedule, since team members' motivation or quality of work may suffer. Ensuring good morale not only guarantees happy, healthy employees; it also ensures that the project operates smoothly.
- **Feasibility:** Proper communication with the relevant stakeholders will increase the likelihood of the project being feasible. Not only will the stakeholders be aware of exactly what the project entails, but they will also be able to offer valuable insight and advice in terms of how the project is planned or structured.

- *Scope and requirements:* It is vital that all stakeholders in a project understand the scope and requirements thereof and that this is communicated effectively – otherwise you run the risk of the project running behind schedule and overbudget, because work has not been completed to specification, it has not been completed at all, or it needs to be redone.
- *Customer engagement:* Communicating exactly what the project is delivering to your clients is important, since you do not want to be accused of misleading your customers and you want to ensure that the deliverable is relevant to them. Nothing destroys customer goodwill quicker than overpromising on deliverables or subscribing to deliverables that are irrelevant to them.

8.5.2 The communication process

At its core, communication in a professional environment is designed to effect change. The sender of the communication wants the receiver to change (or enable change) within one or more of the project areas. Typical communication follows a specific process, as outlined in the following figure:

Elements of communication



(Source: EDGE Learning Media (Pty) Ltd, 2020)

Figure 8.4: The basic communication process

As you saw in the previous figure, effective communication relies on the answers to a few simple questions. Bear in mind that this not only refers to the intent and method of communication, but also to the content of communication. You need to tailor your style of communication to the receiver. In other words, when speaking with a superior, you might take a more formal, less directive tone than when speaking with a colleague or team member. Similarly, it is wise to keep your official communications as simple and clear as possible. You want the receiver to focus on

the content of the message. You do not want them to lose the intent or request of your message among unnecessary noise.

8.5.3 Effective communication

Effective communication is built on the foundation of trust and understanding. The sender needs to understand and trust the receiver, and vice versa. Understanding occurs in three dimensions: it depends on who you are speaking with; the medium of communication; and the message itself.

Firstly, who you are speaking with depends on a variety of factors, such as the receiver's age, position, educational background, as well as how many receivers there are / need to be and how important their involvement in the communication is. Some people just need to be kept 'in the know', whereas others need to act or react in accordance with the message's contents.

Secondly, you need to understand the medium of communication – in other words, the possibilities and limits of a particular communication channel (such as an email, a phone call or a meeting). Each of these communication channels has its own characteristics with regard to factors such as urgency, scope, intimacy, and time requirements. For example, a phone call is usually reserved for urgent communications, requires less time, and is relatively small in scope, while emails are less urgent (aim for a turnaround time of 24 hours or less), but their scope is usually somewhat greater.

When considering the method of communication, you may also consider the sender's and receiver's strengths – some people are better speakers than they are writers – and tailor the communication to their needs.

Lastly, the sender needs to understand the message itself. The sender needs to tailor the tone, content and channel of communication to the receiver. This includes being aware of one's own body language. Since upward of 50 per cent of communication is non-verbal in nature (body language, facial expressions, touch, and even choice of clothing, colour or scent), understanding how these factors influence the reception of a message is crucial (Thompson, 2011). When speaking with someone who continually keeps their arms crossed, for example, the initial assumption may be that they are not open or interested in your message. However, research indicates that crossing one's arms can also be a form of 'self-soothing' and the person across from you may just be anxious or cold (Thompson, 2011). Mutual understanding of everyone's needs and scope will accelerate project timelines, increase morale and cause less friction.

Trust during communication has two dimensions. Firstly, the sender needs to trust that the receivers are willing and able to communicate in good faith. This means that you understand that there is a shared goal (project completion) that can only be achieved through cooperation and communication. Secondly, the receivers need to be able to trust the sender. Trust is gained by remaining open to new ideas, being honest, direct and professional, and using the appropriate language (verbal and non-verbal) to communicate with your counterpart. A lack of trust among project stakeholders can lead to significant impairment of the project in terms of schedule, budget, morale and even completion.

Effective communication is also dependent on an open and respectful environment. To cultivate this, all participants need to know how to listen. Active listening is another skill that is increasingly sought-after in employees. Listening is much more than hearing. Hearing is a passive mechanism, whereas listening means that the receiver is paying attention to what is being said. They disregard unimportant elements of the message; they may take notes; they attempt to understand or interpret the message in good faith; and, importantly, they ask questions. Asking for clarification, detail, verification, or even just that the sender repeats themselves, is crucial to proper understanding of a message. It is the project manager's responsibility to create an environment where questions are encouraged. People often feel foolish asking questions, when in reality, questioning should be encouraged. The sender should take the necessary time to check in with each of the receivers to ensure everyone understands the message.

Finally, proper communication protocols should be documented in the project's communication plan. This document should provide guidance on how to answer questions, such as those shown in the previous figure. The communication plan also outlines each stakeholder's communication needs in order to foster understanding between the project manager and stakeholders.

8.5.4 Barriers to effective communication

Noise is anything that presents a significant barrier to communication – either in the delivery or the interpretation of a message (Nordquist, 2019). The sender of a message needs to account for possible noise in the method of communication and among the various receivers. The easiest strategy to avoid noisy communication is to keep messages as clear and simple as possible. Additionally, the sender needs to select an appropriate method of communication for the message they wish to convey or to compensate for the possible noise they might experience. For example, a conference call or Skype meeting might not be appropriate in an environment with poor connectivity or one that is currently experiencing construction work.

Research has identified six categories of potential noise, which act as barriers to communication (Gulam, n.d.):

1. *Physical:* These barriers stem from environmental factors, such as construction work, physical barriers (doors, walls and windows), traffic, emergency sirens, music, manufacturing noise, and many, many more.
2. *Physiological:* Barriers that arise from either the sender or receiver's physiological state, such as an illness or disability.
3. *Psychological:* Anxiety, stress, anger, depression, and any other emotional state or mental health concern, can present significant barriers to communication.
4. *Perceptual:* Any factor that may influence differences in perception of the same message among senders or receivers, such as age, weight, gender, religion and race.
5. *Semantic:* Overreliance on buzzwords, jargon, slang or the thesaurus can impart noise onto a message. If the receiver cannot understand the message or has a different interpretation of the words that are used, the message is noisy. Clear, simple language is therefore preferred when communicating about a project.

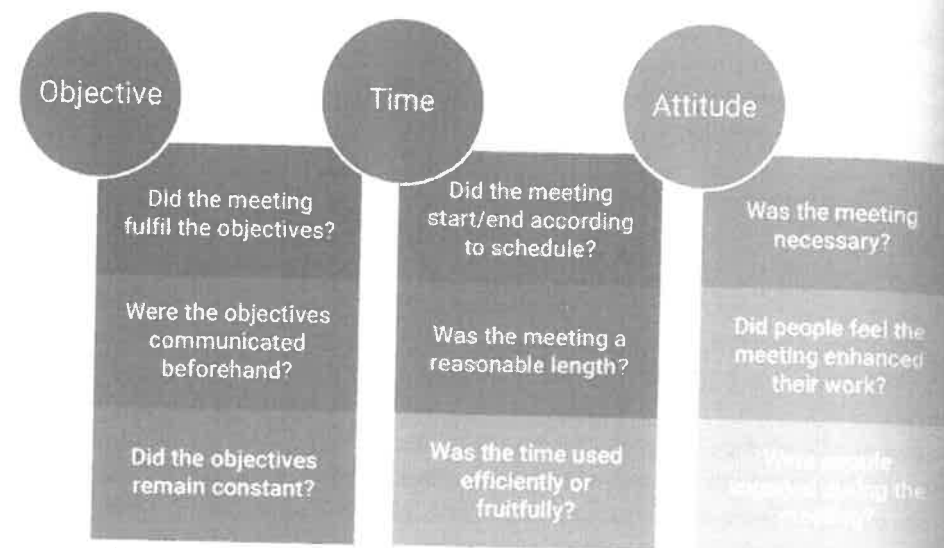
6. *Intercultural:* People from different cultures often have different methods of communication, especially with regard to elements such as body language, facial expressions, and other non-verbal cues. It is therefore important for the sender to understand who the receiver is and tailor their message accordingly.

8.5.5 Conducting successful meetings

Meetings are an essential communication tool in any project. However, without proper planning, meetings can quickly result in lost time and increased frustration. Planning a meeting properly depends on understanding what type of meeting you will lead. There are five meeting categories (Wiley Efficient Learning, n.d.):

1. *Kick-off:* Kick-off meetings are used to introduce the project to the project team, and the team members to each other. These meetings typically occur close to the project initiation date. These meetings share pertinent facts about the project, as well as any relevant project documents, with team members. They are also an opportunity for team members to raise concerns or make suggestions early in the project. Lastly, kick-off meetings are an opportunity for the manager to introduce themselves and discuss their vision for the project.
2. *Status:* Status meetings form the bulk of project meetings and are usually scheduled at regular intervals. These meetings tend to be shorter, more focused in nature, and are used to assess the project's performance at that point in time. The project's schedule, budget, scope, risk and performance are assessed, as is team member performance. The project manager also uses these meetings to share any relevant, new information that concerns the project or specific teams.
3. *Stakeholder:* An essential part of stakeholder engagement is regularly meeting with the project stakeholders in order to keep them apprised of the project's performance and budget. The project manager may also use these meetings as an opportunity to seek advice or assistance regarding certain domains of the project.
4. *Change control:* Should the project's scope expand, or should the project suffer negatively due to risk, it may need to change. Change control meetings need to happen fairly soon after such an event, so that the project manager and project team can discuss which changes need to be implemented and how to implement them.
5. *Review:* During the project closure phase, the project manager uses a review meeting in order to assess the overall performance of the project and the team members. Review meetings are used to discuss which activities, policies or protocols were successful and which ones required more work. These meetings can also be used to celebrate the successful closure of a project.

Once you know what type of meeting you will attend, you can take several steps to ensure that the meeting will be successful. Success in meetings is judged according to three criteria, as shown in the figure that follows.



(Source: EDGE Learning Media (Pty) Ltd, 2020)

Figure 8.5: Criteria and associated questions that can be used to assess whether a meeting was successful

For each of the three dimensions of successful meetings, there are some techniques you can use in order to ensure success.

Objective

- Ensure that you and the attendees are aware of what the objective of the meeting is, in other words, develop and communicate the objectives of the meeting well in advance of the meeting.
- To avoid scope creep, ensure that you limit the meetings to the objectives you mentioned. If the scope of the meeting goes beyond the initial objectives, ask your attendees whether they would prefer extending the current meeting or scheduling another meeting.
- Clarify what type of meeting you will be scheduling. The meeting's objectives will often be dictated by the type of meeting you will have.

Time

- Set an agenda for the meeting. Use the objectives as a guide and develop an agenda that sets out what will be discussed when and for how long. Depending on the type of meeting, the agenda's flexibility might change; for example, status meetings tend to have a more rigid agenda or structure, whereas change control meetings are often more flexible.
- Schedule the meeting by setting start and end times, as well as ensuring no time is wasted trying to find the venue by providing the relevant access details to attendees.

- Remain on topic. The meeting has objectives and an agenda. Do not waste attendees' time by discussing topics that should rather be discussed in face-to-face meetings or over lunch.

Attitude

- Begin the meeting by introducing the topics to be discussed, and end the meeting by summarising what was discussed. For attendees to remain engaged, they should know what to expect and they should be given time to reflect on the contents of the meeting.
- Encourage interaction with the meeting objectives. Encourage attendees to engage by asking them questions and recommending that they take notes and ask questions.
- If the meeting is going to be long, schedule regular breaks where attendees can get some coffee, go to the restroom, or just stretch their legs. Giving the mind some time to reset itself encourages learning and memory.
- Remain on schedule and on topic.
- Follow up with attendees after the meeting. This ensures that any misunderstandings can be clarified, and it provides them with a gentle reminder of what duties they are responsible for, based on what was discussed in the meeting.



EXERCISE 8B

- Conduct your own research to determine the number of communication channels there are in a project, organisation or team.
 - Draw a diagram representing the number of communication channels you may need for a team of seven people.
 - Provide the equation that determines how many communication channels there are.
 - Considering the complexity of a communications web, if a single person in this team is late to a meeting or does not respond to team-wide communication, how many people in the team will be affected?
- Discuss three barriers of communication that you have experienced. Write fewer than three sentences per instance.
- Compare and contrast kick-off and status meetings, using the following table.

	Kick-off	Status
When		
Information		
Sharing		

8.6 MANAGING CONFLICT

Traditionally, conflict is seen as a negative aspect of projects. However, considering that projects are dependent on people, the more pragmatic approach is to view conflict as inevitable and rather develop strategies to manage it and, ideally, turn it into a positive experience for the project or team members. The typical conflict cycle, shown in the figure that follows, indicates that when conflict arises, the manager should abide by the following steps:

- The manager must determine whether or not they need to intervene in the conflict. They need to examine the stakes of the conflict and the potential risks of not intervening.
- If the manager intervenes, they need to determine the causes of the conflict. This may not be a simple task, since what caused the conflict may not be the reason for the conflict; for example, long-term resentment may have built up over several weeks or months and only come to the fore on account of some minor event.
- The manager must then determine the impact of the conflict. They determine how much of their intervention is necessary and which approach they should take to resolve the conflict.
- Once the manager has all the relevant facts, stakeholders and policies at hand, they can turn to managing the conflict. There are several strategies they can employ, which are discussed further on in this section.
- The conflict then enters the resolution phase, where open and honest conversations are had between all involved parties in order to determine the next course of action.
- Lastly, after a conflict, the manager decides whether project or organisational policies, protocols or structures need to be altered in order to prevent or better manage future conflict.

The project manager can decide which conflicts they think need to be managed, but at the very least, they should remain aware of potential or ongoing conflicts.



(Source: EDGE Learning Media (Pty) Ltd, 2020; adapted from Khan et al., 2017: 155)

Figure 8.6: The typical conflict-resolution model

8.6.1 Causes and impact of conflict

On account of the complexity of projects and people, the causes of conflict are plentiful. Some causes of conflict include the following (Guan, 2007):

- *Poor planning:* If team members do not know their responsibilities, schedules, budget allocation, or the scope of the task they are assigned to, conflict will occur – usually between the team members and the project manager.
- *Poor communication:* Lack of proper communication between project management, project teams and stakeholders will result in conflict, on account of the lack of clarity, openness and transparency on different areas of the project.
- *Excessive 'crunch' time:* Certain projects might increase the quantity or intensity of their workload as deadlines approach. Such high-stress environments will significantly strain project members. Environments rich in stress and anxiety are a perfect breeding ground for conflict.
- *Cultural differences:* Due to the increasing connectivity and globality in projects, team members from various cultural backgrounds will have to work together. Considering the complexity of a single culture, having people on the same team with different – or even opposing – cultural backgrounds is sure to cause conflict.
- *Personality differences:* Interpersonal conflict due to a mismatch of personalities is one of the most common types of conflict.
- *Organisational issues:* 'Top-down' directives that negatively affect team members will cause morale failures and conflict. Organisations often make decisions for their workers without consulting them. Left unchecked, such conflict can quickly turn to resentment for project managers, stakeholders and the C-suite.
- *Resource conflicts:* Scarcity, misappropriation or improper assignment of resources (such as time, staff members, physical resources, or any resource defined by the resource breakdown structure [RBS]) can lead to conflict among team members.

These (and other) causes of conflict can be categorised into four areas (Guan, 2007):

1. *Team:* Team conflicts often arise during the storming phase of team formation. These conflicts encompass factors such as a lack of commitment, poor communication, mismatched expectations, and conflicts regarding roles and resources. Conflicts of this nature result in a lack of trust and cohesion, as well as an unnecessarily competitive spirit among team members.
2. *Culture:* Violations of a culture's boundaries or norms (e.g. dress, language, tone, body language and customs) often result in conflict that would normally be easily avoidable by growing the communication quotient (CQ) among team members.
3. *Project:* Project conflict usually arises as a result of poor planning and communication, mismatched expectations among stakeholders, and poor allocation and responsibilities regarding resources and schedules.
4. *Personality:* These conflicts arise from the natural differences in people's personalities. The project manager would do well to bear in mind their team's personalities.

The impact of conflict on a project is often easier to assess than its causes. There are several areas where conflict can have a significant impact: morale, schedule, cohesion, communication and organisational processes (Guan, 2007).

Conflict will result in a significant drop in team morale. If team members cannot agree with each other, or if they cannot stand each other, they will not want to work in the same space or even on the same project. This often results in a significant loss of morale, as the workspace is no longer a professional, neutral or even enjoyable environment. Rather, it is characterised by stress, conflict and anxiety. Moreover, conflict can spiral outward and affect team members who were not initially part of the conflict. Remember, despite its professionalism, the workplace remains a social environment by virtue of humans being social creatures. Friendship groups or cliques will form, and if one member of the group or team suffers, it is natural for the rest of the group to want to align themselves with that member. Consequently, conflict has the potential to spread to the entire project team if not properly managed. However, if properly managed, conflict can actually boost team morale. By addressing the conflict directly and diplomatically, the project manager has an opportunity to create an open and honest environment where people feel comfortable and their concerns are heard. Rather than each team member bottling up their negative experiences to the point of resentment or burnout, 'clearing the air' may prove beneficial to the project environment (Guan, 2007).

If team members struggle to work together on account of conflict, the work will suffer. If certain team members are unable to work peacefully or professionally with other team members, time and productivity will be lost. Similarly, conflict threatens team cohesion. If team members are in conflict, they are less likely to want to cooperate with each other. Remember, a team is a group of people who work together. Conflict threatens the 'togetherness' of a team. If the team begins to crumble, the quality and schedule of their task will suffer. Moreover, once one team experiences setbacks and conflict, it is likely to affect other teams as well, impacting their work, morale and 'togetherness'. If left unmanaged, conflict will quickly result in people not working toward a common goal and being unmotivated and behind schedule – factors that could threaten the entire project. Resolving conflict early on can therefore prove to be beneficial to the project schedule and for team cohesion. By fostering a dialogue between feuding members or teams, the project manager can instil a sense of shared purpose and vision among their followers (Guan, 2007).

Lastly, conflict can result in the breakdown of communications and organisational processes and protocols. It is very easy for feuding members to dismiss each other's work based on a mutual dislike – regardless of whether protocols, processes or communications are up to standard. Moreover, if project members begin ignoring each other's requests for information, resources, or any other kind of mission-critical communications, the consequences for the project schedule, budget, scope and even the project's existence, could be dire. In these instances, resolving conflict can result in clearer, more open channels of communication or enhanced protocols or processes that benefit the organisation. There may be legitimate shortcomings with a process or protocol, but since the relevant team members are not communicating with one another, these shortcomings are never addressed, and the project will run below efficiency. It is therefore in the interest of the project's health that the manager tries to resolve conflicts before they become critical.

8.6.2 Resolving conflict

Several approaches to conflict resolution have been identified (Ohlendorf 2001):

- *Confronting*: The confronting approach is not necessarily confrontational in itself. It simply means applying 'problem-solving, integrating, collaborating or [a] win-win style' (Ohlendorf, 2001). The conflicting stakeholders meet face to face and attempt to collaborate in order to achieve an outcome that satisfies both of them. This approach requires trust and open, clear communication.
- *Compromise*: Using this approach is necessary when negotiations have come to a standstill. All parties involved in this conflict will end up sacrificing some aspect of their desired solution in order to resolve the overall conflict. This approach helps to maintain relationships and allows the manager to reach a solution relatively quickly.
- *Smoothing*: Smoothing requires that one or more parties sacrifice their wants and needs in service of the greater good. This technique is best used during conflicts that stem from minor disagreements, or where the stakes are relatively low. The project manager may use this technique to prevent losing something while not really gaining anything, except more time to negotiate or resolve the conflict.
- *Forcing*: The project manager makes use of their authority in order to force a specific solution to a conflict. As the time pressure or stakes of a conflict increase, quick and decisive action may be more important than keeping everyone happy. The project manager may therefore create a win-lose situation, but the ends could justify the means. After all, it is the project manager's responsibility to get the job done.
- *Avoidance*: When there is no immediate solution at hand, or when making a decision is not in the best interest of the manager (they want to maintain neutrality), then postponing or avoiding conflict resolution may be an appropriate – albeit temporary – solution. Sooner or later, the conflict will need to be resolved; either when the stakes are higher or when the manager is better prepared.

Regardless of which method the project manager considers appropriate, you can see how each of these methods relies on a strong ability to communicate clearly with everyone involved. It is also important to keep the relevant stakeholders informed of any potential or ongoing projects, so that you may rely on their skill, advice or expertise if necessary. Lastly, if the resolution of a particular conflict seems to be beyond the manager's ability (or if it directly involves the manager), it may be useful to appoint a neutral third party to mediate the conflict.

8.7 CULTURE IN TEAM MANAGEMENT

Nowadays, there is greater connectivity among projects and people than ever before, and a continuing trend of globalisation among organisations. It is therefore vital that the project manager takes into account possible cultural differences among team members. This section discusses concepts (such as culture and cultural intelligence) that contribute to the manager's knowledge and understanding of culture, and how to integrate people from diverse backgrounds into the same project.

8.7.1 Cultural intelligences

There are four dimensions of cultural intelligence (Kiznyte et al., 2015: 6):

1. **Drive:** The 'drive' toward cultural intelligence represents one's motivation, want or need to integrate with other cultures. This can be *intrinsic* in nature, by someone being naturally curious, interested or open to new cultures; or it can be *extrinsic*, by there being some external factor (such as profit and reward) or some other benefit to engaging with different cultures. Regardless of what the motivation is, the existence of such motivation remains crucial to cultural engagement.
2. **Knowledge:** Being aware of different cultural norms is the first step to understanding them. The culturally competent leader is able to engage with people from different cultures on their terms without potentially offending them.
3. **Strategy:** This involves understanding the different cultural dimensions of one's team in order to plan accordingly. This allows the project manager to adjust their scheduling, WBS, RBS, or any other dimension of the project in order to better plan, communicate and execute the project to everyone's satisfaction.
4. **Action:** Acting and communicating appropriately with people from different cultural backgrounds in order to show respect and support represents the highest level of cultural intelligence.

Culturally intelligent managers, teams and stakeholders have several advantages over those who lack CQ. They can lead people from diverse backgrounds much better, since they are able to build on a platform of mutual trust and understanding. They are more likely to attract diverse talent to their organisation. They can adapt to work in a variety of organisations, contexts and cultures. They have an edge when it comes to negotiating with people from different backgrounds, since, as before, they can communicate from a platform of mutual understanding (Kiznyte et al., 2015: 7–8). Lastly, it is not only important for the project manager to exhibit cultural intelligence; they also need to foster high levels of CQ within their team members and stakeholders.

8.7.2 Cultural differences

According to Lewis, there are three broad categories that most cultures can be classified as (Hassan and Ilyas, 2014):

1. **Linear active:** These cultures tend to be well organised, methodical and task-oriented. They prefer their own company over that of others, as well as a quiet, clean and organised workspace. They are known for their professionalism, dedication, restraint and ethical behaviour.
2. **Multi-active:** Cultures that rely on people-skills, conversation, negotiation and diplomacy. People from these cultures are gregarious, flexible, emotional, and not as organised as those from linear-active cultures.
3. **Reactive:** These cultures are similar to the linear-active cultures. However, reactive cultures also emphasise qualities such as respect, honour, dedication, being caring and honesty. They try to blend some of the social skills of multi-active cultures by being quiet and

observant listeners, as well as seeking and dispensing favours. They attempt to blend the business and social spheres, while linear-active cultures prefer to keep them separate.

These classifications are expanded on by Hofstede's (2011) model of cultural dimensions, as follows.

Cultural dimension	Description
Power distance	How much value a specific culture assigns to hierarchy. Cultures with lower power distance indices (such as Germany and Israel) are more likely to challenge leaders, whereas those with high power distance indices tend to follow without questioning.
Individualism/collectivism	How much a culture stresses 'I' or 'we'. Cultures with higher scores on this index tend to stress personal development, choice and self-actualisation.
Masculinity/femininity	This dimension refers to whether a culture stresses traditionally masculine traits of heroism, performance, assertiveness and success; or traditionally feminine traits, such as cooperation, caring, modesty and happiness.
Uncertainty	High scores on this index reflect cultures that prefer to avoid uncertainty through regulation, policy or laws. Lower scores indicate cultures that tolerate or even thrive on ambiguity or uncertainty.
Long term / short term	Cultures that emphasise tradition, history, stability and suspicion tend to score lower on this index than those that lean toward more pragmatic, contextual and modern interpretations of events or procedures.
Indulgence/restraint	Is the culture known for indulgence, impulsivity, extroversion and being social, or does it tend to be more cynical, restrained and pessimistic? Lower scores indicate more restrained cultures.

(Source: EDGE Learning Media (Pty) Ltd, 2020; adapted from Hofstede, 2011)

Table 8.1: The different cultural dimensions

Neither of the models discussed outlines all the cultures on the planet, and care should be taken to avoid using them to generalise or stereotype people. Furthermore, a growing number of people are multicultural in their upbringing and may be more difficult to assess using these cultural dimensions. The culturally intelligent project manager should therefore use them as a guide, but remain prepared and adaptable should the individual not conform wholly to any preconceived notion of their culture.

8.8 TEAM COLLABORATION TECHNIQUES

Considering the growing size, complexity and diversity of teams, it is becoming more important for project managers to focus on fostering collaboration between and among teams. Research indicates that, as a team increases in size, complexity and dispersion (i.e. spread over different regions or countries), the team members are less likely to consider themselves as 'part of the team',

nor are they likely to want to cooperate with other team members (Gratton and Erickson, 2002). In order to create an atmosphere that encourages collaboration, sharing and support, there are several methods the project manager can use (Gratton and Erickson, 2007; and Campbell, 2011).

- **Executive support and modelling:** It all begins at the top. Managers need to encourage and support collaboration and cohesion, as well as embody it. If those at the top do not need to collaborate, why should those at the bottom? It is imperative that the project manager embodies all the qualities that they want from their team members. Furthermore, the leadership of a project or organisation must be willing to show that they support initiatives that foster collaboration and cohesion – even if it is as simple as an email or a short meeting that acknowledges the importance of working together. Of course, financial or structure support for these initiatives would be even more helpful.
- **Reward or gift cultures:** These techniques are twofold. The manager either instils a culture of rewarding employees for good work – either by being on schedule, under budget or having innovate solutions or insights, or the manager creates a culture where the 'gift' of time is freely given. Daily sessions of coaching, mentoring or training become commonplace in the workspace and, while not as much as they would with a tangible reward, employees feel appreciated, motivated and invested as their development and training are furthered.
- **Clear communication:** Possibly the simplest and most straightforward of the techniques is to communicate clearly and simply with team members. If the manager can express the vision, expectations and constraints of the project clearly to each team member, as well as what each member will be responsible for, they can avoid miscommunications, conflict and project inefficiencies. By encouraging team members to communicate clearly and simply, the manager fosters a culture of openness, honesty and transparency.
- **Encouraging member strengths:** Placing team members in positions where their qualifications or strengths are most appropriate helps to show appreciation for a member's strengths and prevents conflict or stress if members are placed in unfamiliar situations. By setting up members as experts at a specific task or in a certain field, other members of the project will naturally seek out their expertise and knowledge.
- **Appropriate hiring protocols:** Hiring people based on their qualifications and ability to settle into company culture – as opposed to nepotism or cronyism – means that everyone is aware that their colleagues have the necessary skills and personality to complete their tasks.
- **Supporting a sense of community:** Policies and protocols in an organisation that foster a sense of community help to build cohesion and in-group behaviour among employees; for example, team-building exercises, company retreats or any other number of activities that bring people together are perfect for building teams.
- **Promote cohesion:** Encourage team members to socialise outside of work, rotate team leaders, promote further training and development of teams (not just individual members), make (and keep) promises to team members, encourage question asking and out-of-the-box thinking, and develop a shared sense of cause and community among teams and team members.



EXERCISE 8C

- Analyse a country of your choice according to Hofstede's dimensions of culture. Use the cultural-analysis tool found here: <https://www.hofstede-insights.com/country-comparison/>. Tabulate the scores and provide a short interpretation of them (no more than two sentences).
- Think of a well-known leader in any field.
 - List a major conflict in their career.
 - Discuss how they resolved this conflict (in no more than six sentences).
 - What technique or blend of techniques did they use to resolve the conflict?
- Research improper or nepotistic hiring practices.
 - List three recent examples covered in the news.
 - Discuss the effects that one of these had on the organisation and organisational culture (in no more than four sentences).

8.9 PROJECT MANAGEMENT IN PRACTICE

Sandy has recently been assigned as the project manager for a large promotional event. She is given a team of 12 people to assist in the planning and execution of the event. To her mind, the team possesses a wide set of skills and expertise, and is capable of generating a large portfolio of solutions to problems within the project environment, both in planning and executing the project.

However, when it comes to the initiation of the project tasks, there seems to be a lack of communication between members, causing an atmosphere of disjunction and individualism. Some members have formed cliques, while others seem to keep to themselves and only get involved when absolutely necessary.

Sandy sees that team morale is beginning to waver, and she has even heard that two members want to quit the project after a verbal altercation with other members of the team. The project is now four weeks in, and Sandy fears that the project will fail to meet the outcomes that have been set. With only eight weeks left, is it possible for her to turn things around?

Required:

- Using the forming, storming, norming and performing stages of development, determine how Sandy failed to develop a high-performance team. Suggest what she should have done, and what she can still do, to bring her team out of the storming stage and into the performing stage.

- (ii) Twelve people in a project team is a considerable number, and operations and communication may become disorganised. What could Sandy do to lessen the risk of damaging events occurring?
- (iii) There is ineffective communication among the group. Propose three barriers that could be preventing the team from communicating effectively.
- (iv) There is also conflict between two groups of individuals in the project team.
 - a. Discuss why it is important that this conflict is resolved promptly.
 - b. Name two conflict-resolution strategies that could be employed to assist in this matter.

8.10 SUMMARY

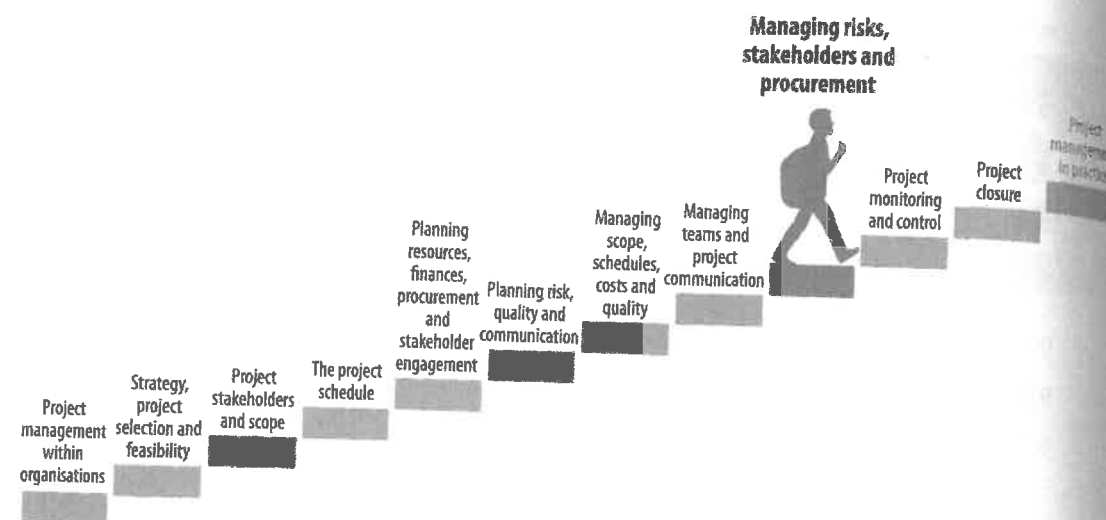
In this unit, we discussed the project team, communication, collaboration, culture and conflict. By now, you should be able to develop effective strategies for selecting, developing and onboarding your project team. You will also be able to guide them through the stages of team development, minimising conflict and increasing cohesion and team spirit. The importance of proper communication in a team, project or organisation cannot be overstressed. You should be able to identify shortcomings, barriers and conflicts in communication, and develop strategies to remediate these as quickly as possible.

Moreover, you should understand the importance of taking the cultural aspects of your team members or organisation into account, and of fostering the development of CQ within yourself and within team members. We also discussed the causes and impact of conflict, along with several techniques to resolve conflict when it arises. Lastly, we discussed several techniques you can use to encourage collaboration among team members. Remember, all of these aspects will contribute to the smooth operation of your project and the well-being of your team members. Incorporating aspects of culture, communication, conflict resolution, team development and simple humanity in your management strategies is the mark of a mature and professional project manager.

9

MANAGING RISKS, STAKEHOLDERS AND PROCUREMENT

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9.1 INTRODUCTION

Imagine yourself as a project manager for a prestigious international conference. The success of the conference depends on the presence of both the key speakers and the attendees, as well as the provision of various catering and facilities, such as restrooms. There are various things that could go wrong, and each of these mishaps could have a different level of severity for the project. For example, a lighting failure may prevent a speaker from delivering their presentation on time, but a delayed flight could prevent a speaker from attending the conference at all. Every area of your project involves some level of risk, but it is up to you as a project manager to determine how the project team will respond to the risks that the project faces.

You may need to consider the level of impact, which areas of the project are affected, as well as the cost, quality and performance implications of the risks. As a project manager, you take on full responsibility to ensure the successful achievement of all project objectives. A key part of this process is to have contingency plans in place, in case of unforeseen circumstances – particularly where risks, stakeholders, and procurement are concerned.

After studying this unit, you should be able to:

- discuss the processes of risk identification, analysis, ownership, and implementation;
- implement strategies to manage project stakeholders;
- appraise the importance of managing conflicting interests, communication, and change management with regard to stakeholders;
- outline the objectives of supplier management and the role of communication and relationship building in achieving those objectives;

- explain the process of reviewing the project execution phase; and
- apply your knowledge of project execution processes to both fictional and real-life cases and scenarios.

9.2 KEY TERMS AND DEFINITIONS

The following key terms and definitions are applicable to this unit:

- **Delphi technique:** A technique used to gather information and ideas anonymously from project experts, which will be used to find a consensus that will inform a decision.
- **Procurement management:** The process of acquiring raw materials, which include products or services, for the purpose of using them to achieve project objectives.
- **Project sponsor:** A person, group of people, or organisation that finances or supports the project by providing necessary resources.
- **Qualitative risk analysis:** The process of estimating the likelihood of a risk occurrence and its impact on a project in order to prioritise risks.
- **Quantitative risk analysis:** A method of numerically evaluating the impact of identified risks on project goals and objectives.
- **Risk identification:** The process of scanning the project environment, identifying the project threats and documenting the characteristics and impact of these threats.
- **Risk management:** A holistic, proactive approach that documents, monitors and controls risks in order to make projects less vulnerable to the risks they face.
- **Stakeholder:** A person, a group of people, or an organisation that will be affected by the project processes or outcomes.
- **Stakeholder management:** A systematic process of identifying individuals, groups or organisations that have a direct or indirect interest in the project, and of developing communication management plans to engage and influence them in project decisions and execution.

9.3 RISK MANAGEMENT

Risk management is a holistic, proactive approach that seeks to make projects less vulnerable to the risks that they face. We manage risks through a process of risk identification, risk analysis, assignment of risk ownership, risk response planning, and risk response implementation (Ravindranath Pandian, 2007: 19; and Kerzner, 2003: 655). Ravindranath Pandian (2007: 18) explains that the purpose of risk management is to minimise risk impact – i.e. to reduce the effect that the risk would have on the project, if the risk became a reality. This systematic approach should lessen the likelihood of negative events and increase the impact of positive events (Project Management Institute, 2013: 336).

The project manager must be able to predict potential problems and decide on a corrective course of action to minimise the potential impact of these problems (Martinelli and Milosevic, 2016: 377). Risk management should not be treated as a separate activity, but rather, as a crucial component of the overall project. It must be closely linked with key project processes, including overall project processes, engineering systems, costs, scope, quality and schedule (Kerzner, 2003: 655).

The benefits of risk management can be found in two distinct categories, namely the direct (or primary) benefits, and the indirect (or secondary) benefits (Ravindranath Pandian, 2007: 20). The direct benefits include enabling the achievement of project goals, making the project less risk-prone, preparing and enabling the project teams to solve problems, and reducing the cost of poor quality. The indirect benefits include improvement in the setting, estimation and planning of project goals, better decision-making, easier identification of alternative methods and approaches, optimisation of processes, teamwork, and group thinking.

9.3.1 Risk identification

Risk identification is the process of scanning the project environment, identifying the project threats and documenting the characteristics and impact that these threats would have on a project (Pinto, 2019: 268; Project Management Institute, 2013: 319; and Ravindranath Pandian, 2007: 57). The main advantage of this process is that it keeps a record of existing risks and allows the project team to think or take action before an event occurs (Project Management Institute, 2013: 319). A project survey can help to identify potential risks for concern (Kerzner, 2003: 885). Once risks have been identified, they should be analysed and dissected in depth, so that the project team knows the nature and causes of the risk. If we know the cause of a risk, we may be able to address the cause and remove the risk, or at least manage it better.

Project risk identification must be carried out throughout the project life cycle, as new risks can develop. This iterative (step-by-step) process is dependent on the circumstances and the nature of the project. The process should involve the project team, who will develop and maintain a sense of ownership and responsibility for the risks and related activities (Project Management Institute, 2013: 321).

There are several ways to identify risks, such as brainstorming sessions, consulting internal and external project experts, using historical information from similar projects, the Delphi technique and a SWOT analysis (Martinelli and Milosevic, 2016: 379; Kerzner, 2003: 885; and Ravindranath Pandian, 2007: 60). These are summarised as follows:

- **Brainstorming:** The purpose of brainstorming is to identify and create a list of potential project risks. This exercise can be done by the project team, multidisciplinary project experts, or non-experts. Brainstorming sessions can be done face-to-face, or through the use of information communication technologies, such as Skype. The various risks that are identified are then clustered according to their nature, impact, or probability of occurrence.
- **Expert judgement:** There are individuals who hold project expertise, and such individuals are able to assist with risk identification when consulted. Project experts use their past experience and skills to suggest possible risks that may affect a particular project.
- **Historical reviews:** This process entails a review of previous similar project records, current project plans, contractual agreements, project team, and resources, with the aim to identify possible project risks. A thorough review of these source documents can provide indicators of risk in the project.
- **Delphi technique:** This technique can be used to gain information and ideas from project experts. A questionnaire is used to gather ideas about possible project risks from the experts anonymously.

and the results are then summarised and sent back to experts for further comments. The aim of this feedback loop between experts is to reach a consensus of potential risks that may impact a project. The feedback may be circulated more than once until a consensus is reached.

- **SWOT analysis:** The use of a SWOT (strengths, weaknesses, opportunities and threats) analysis helps you to inspect a project by examining its strengths, weaknesses, opportunities and threats. The project is examined both internally (strengths and weaknesses) and externally (opportunities and threats), which helps to identify possible project risks.

It is essential to note that risk levels vary depending on the project life cycle stage or the nature of the project (Martinelli and Milosevic, 2016: 380). Identified risks need to be reviewed carefully in order for the project to be adjusted accordingly. The end goal of risk identification is to create a risk identification checklist that will be used throughout the life cycle of the project.

The risk identification checklist should be shared with all members of the project team. It can also be standardised within the company, and used for similar projects as a source document. The risk identification checklist contains the previous risks that have occurred in other, similar projects, as well as details of potential risks that are likely to occur and affect the current project. Writing this checklist helps project managers and the project team to be fully aware of these risks and decide on a possible course of action if they occur. The checklist should be updated on a regular basis, so that it includes new possible risks or removes risks that no longer fall within the scope of the project. The following figure shows the relevant areas of a project that relate to typical risk impacts.

Risk impact areas		Relevant to
Project objectives	People	Health and safety
	Environment	Preservation of nature
	Commercial loss	Production delays
	Cost	Confidence of estimates
Company reputation	Schedule	Schedule or milestone delays
	Quality	Meeting customer satisfaction by achieving project quality requirements
	Corporate image	Continued business after the project is complete, and the reputation of the business
	Relation with third-party stakeholders	Other parties who may have a stake in the project processes or work (e.g. authorities)

(Source: EDGE Learning Media (Pty) Ltd, 2020; adapted from Rossi, 2007)

Figure 9.1 Risk impact areas

9.3.2 Qualitative and quantitative risk analysis

A qualitative approach to analysing risk is where the project manager describes the effect that each risk will have on the project. These descriptions can be created through interviews, expert judgement, or reviewing project documentation from similar projects. Qualitative analysis will also set a standard to determine whether a risk has been described in enough detail for a quantitative analysis to begin – i.e. the level of detail needed to assign a number to the risk.

Quantitative risk analysis is where risk descriptions are converted into numerical values that can be represented and analysed in statistical graphs or models. This is usually done by using a numerical rating scale (e.g. from nought to ten), which identifies the level of a risk according to its particular qualities. Quantitative approaches include the probability and impact matrix, expected monetary value (EMV) calculation, payoff matrices, and modelling or simulation. The key difference here is that an approved, structured, repeatable methodology is used, rather than a subjective approach that may yield uncertain or inaccurate results (Kerzner, 2003: 892–893).

The two most common categories used to analyse risks in both qualitative and quantitative methods are probability and impact. Risks are evaluated using expert opinion, and compared to all relevant probability of occurrence scales as well as the three consequences of occurrence scales (cost, technical performance, and schedule). The results are then converted into quantitative data by using a risk mapping matrix to assign these values to a corresponding risk level. The risk is then included in a prioritised list based upon the risk level, as well as other considerations; for example, the frequency of occurrence, the time to impact, and interrelationships with other risks (Kerzner, 2003: 897).

Qualitative risk analysis

Qualitative risk analysis is the process of describing the probability of a risk occurring, as well as the impact that the risk would have on the project, in order to prioritise the management of the highest risks (Project Management Institute, 2013: 328; and Kerzner, 2003: 892). This process eliminates uncertainty by describing risks in detail, and helps us to determine which risks may have a high probability of occurrence. Qualitative risk analysis can be carried out systematically throughout the project life cycle (Project Management Institute, 2013: 328). We will now explore some methods of qualitative risk analysis.

Interviewing

Interviewing is a method of data collection that captures the experiences of the project team and the project manager, and combines these with data that has been captured before, in order to determine the probability and impact of risks that relate to the project objectives. Risk interviews help to provide reliable and credible insight about the nature of each risk.

Expert judgement

Experts have experience and skills that can help to describe risk impact and probability. Their expertise is derived from previous projects, or from research that they have performed about

these projects. They can be interviewed or engaged at workshops in order to get their insight into possible risks.

Risk categorisation

Risks can be placed into categories that help to determine which areas of the project are most affected by potential risks. Risks can be categorised in many ways, which may include the source of the risk, the project phase likely to be affected by the risk, or the stakeholders that would be affected by the risk. This categorisation will ultimately help the project team to develop efficient and effective risks responses.

Risk urgency assessment

Among the risks that would have been identified, there may be risks that require urgent attention. The urgency may be determined by the probability of occurrence, the time frame of occurrence, signs and symptoms, and risk rating. In order to increase the impact of this tool, it can be combined with a quantitative tool, such as risk ranking.

Risk data quality assessment

This tool is used to determine the usefulness of data gathered about risks. The data obtained about each risk must be robust in terms of its quality, reliability and integrity, and the project team should also have a good understanding of the risk. The data must meet minimum acceptable standards, and be described in enough detail, for it to be deemed useful.

Quantitative risk analysis

Quantitative risk analysis is a statistical or numerical method of evaluating the impact of identified risks on project goals and objectives. The overall aim of quantitative risk analysis is to help project managers make better decisions and reduce unpredictability in project planning. Risks that have been identified as high priority are further examined using qualitative risk analysis, and, then, are ranked according to a scoring model. Quantitative risk analysis should be performed repeatedly until the risk impact has been reduced (Project Management Institute, 2013: 332).

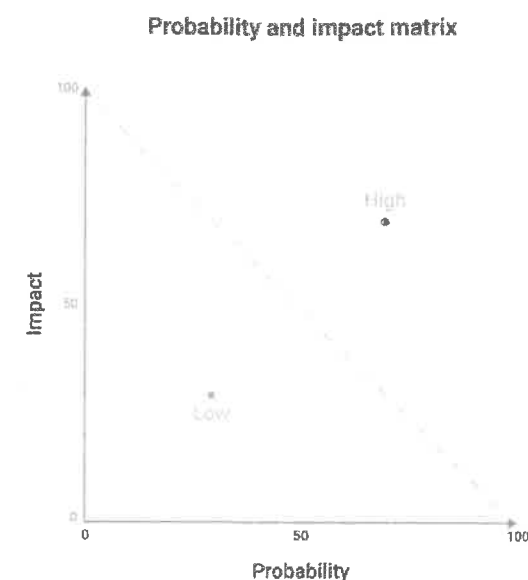
Risk probability and impact assessment

Risk probability and impact examines the probability and impact of each identified risk. Once a risk has been identified, the risk impact assessment cross-examines the risk's negative or positive effects on project objectives, with specific attention to the project schedule, cost, quality or performance. This analysis can be carried out by interviewing selected participants, who may be part of the project team or external parties.

Probability and impact matrix

The probability and impact matrix situates various identified risks based on the probability of their occurrence and the impact they would have on the project objectives. Various criteria are used to

rate each risk, and different colours may be used to denote the level of impact and probability of occurrence. Other criteria may include low-, moderate- and high-priority risks. An example of this matrix is provided in the following figure.



(Source: EDGE Learning Media (Pty) Ltd, 2020)

Figure 9.2: Example of a probability and impact matrix

Sensitivity analysis

Sensitivity analysis helps project managers to assess which identified risks are most likely to affect project objectives. This helps us to understand how variations from the project baseline would interact with various uncertainties. It also examines how each project element would impact the project objectives if all other uncertain elements are constant.

Expected monetary value analysis

EMV analysis is often represented in a decision tree, with a positive value representing EMV opportunities and a negative value representing threats.

Modelling and simulation

A project simulation makes use of any details provided about project uncertainties to determine their impact on project objectives. Various techniques can be used to perform simulations, but the most common method is the Monte Carlo technique.

Probability distributions

Probability distributions are often used in simulations and mathematical modelling, as they provide a time frame of activities and map the activities against their costs over time. A decision tree can be used to show the impact of different uncertain events.

Expert judgement

Experts with relevant project experience can help to determine the potential cost and impact of project uncertainties. Experts can interpret data derived from various quantitative tools, and also provide insight into the strengths and weakness of various project tools.



EXERCISE 9A

- (i) Explain the relevant concerns for a risk that is posed to the company's reputation.
- (ii) Discuss the difference between qualitative and quantitative risk analysis.
- (iii) Differentiate between the role that expert judgement plays in qualitative and quantitative risk analysis.

9.3.3 Risk ownership and responses

Once risks have been examined qualitatively and quantitatively, a determination must be made about how to manage the risks that have the highest impact on the project objectives. The identified risk should be assigned to a risk owner who regularly monitors it. The available options to deal with the various risks are discussed in the section to follow (Martinelli and Milosevic, 2016: 383; and Project Management Institute, 2013: 342).

Strategies for negative risks or threats

A risk that has a negative impact on the project objectives requires a particular response strategy. The available options to manage threats and negative risks are to (1) avoid, (2) transfer, (3) mitigate or (4) accept the risks. However, these strategies should be chosen only after examining the risk's probability and impact on the project's objectives (Project Management Institute, 2013: 344–345; and Ravindranath Pandian, 2007: 102). These four options are discussed as follows:

1. **Avoid:** Risk avoidance strategy protects the project from the risk impact in various ways, such as changing a project plan or isolating the risk from the project objectives. A more aggressive risk avoidance strategy is to shut down the project completely. If a risk must be avoided, but it is attached to the project goals, it can be difficult to avoid. Another method to avoid the risk may include extending the project schedule, obtaining necessary expertise or improving communication.

2. **Transfer:** Risk transfer is a technique in which the project team hands over the responsibility of the risk to a third party who has relevant skills in handling similar risks, or who will absorb the impact of the risk in the event that the risk occurs (e.g. insurance). Transferring the risk does not eliminate it, but it does remove the risk from the project once it has occurred, as a third party will be responsible for managing it. This strategy may be costly, as the project would need to budget for risk transference, such as for the cost of hiring an insurance company.
3. **Mitigate:** Risk mitigation is a technique where the project team works to reduce the probability of the risk occurring at all. The project team devises a way to reduce the impact of the risk and its probability of occurrence. This may include careful selection of suppliers, conducting more tests, or replanning the order of tasks.
4. **Accept:** Risk acceptance is when the project team decides to take no action until the risk occurs. This strategy may be applicable if the project team cannot change the project plan or if other available options to evade the risk are not cost-effective. The project team may also opt for this option if there seems to be no suitable response strategy, if the risk is not likely to occur, or if it would have a very low impact. Experienced project teams may learn to live with certain risks, while staying aware of their causes and impact on the project objectives. However, it is necessary for the project team to have contingency plans in case the risk occurs.



(Source: EDGE Learning Media (Pty) Ltd, 2020)

Figure 9.3: Risk management strategies

Risk monitoring

The identified and analysed risks need to be constantly monitored. This is to ensure that the project team is well aware when the risk occurs, and that they take the necessary steps to manage the risk. It is important to identify what would trigger each risk, and to determine the threshold of severity that the risk would need to exceed before the project team needs to act on it.

Strategies for positive risks or opportunities

A risk that has a potentially positive impact on the project objectives is called an opportunity, and opportunities require different response strategies to negative risks. Strategic responses can be to (1) exploit, (2) share, (3) enhance, or (4) accept the opportunity (Project Management Institute, 2013: 345–346). These four responses are summarised as follows:

1. **Exploit:** The opportunity can be exploited to maximise its benefits, which may also reduce other negative risks. For example, if there is a risk that the business will experience cash flow problems, an opportunity for further sponsorship could address the cash flow risk by providing more available funding for the project. The project team will need to decide if an opportunity is worth exploiting or not, by determining its overall impact on the project objectives.
2. **Enhance:** The enhancement technique is used to increase the likelihood, and/or positive impact, of the opportunity. Identification and maximising the driving factors behind these opportunities can increase the likelihood of their occurrence, or the benefit that they provide to the project.
3. **Share:** The sharing of an opportunity means that a third party, who is better able to take advantage of the opportunity and support the company, can be given some or all ownership of the opportunity. This may involve establishing risk-sharing teams or joint ventures, with the sole purpose to maximise the positive effects of the opportunity for the project or for the business.
4. **Accept:** Acceptance is recognising that the project is ready to make use of the opportunity; however, the project team does not need to pursue it actively.

9.3.4 Implement risk responses

A risk response organisation or team needs to be created to respond to risks timeously. This designated organisation or team ensures that all the necessary steps in responding to risks are taken. A risk culture will also need to be created, in order to prevent resistance or ignorance toward handling risks that may be hazardous to the project objectives. Risk response culture should be part of the project team and the organisation, assisting in the achievement of the project objectives (Ravindranath Pandian, 2007: 110).



EXERCISE 9B

Consider the following hypothetical scenario and answer the questions that follow.

Mountain Reserve is an old dam in the Western Cape that was first built in the 1920s, and the local government has determined that, due to the recent water crisis, it is necessary to increase the dam's capacity, as well as to reinforce its existing walls. The dam wall will need to be raised by 15 m, but the older stonework of the existing dam walls must remain in place, and the dam must be bolstered by a secondary wall built on its exterior. As the dam is currently at 70 per cent capacity, the municipality has indicated that its water is critically needed for the surrounding agricultural industry, so none of the materials used in the reinforcement should be toxic or degrade the quality of the water. The local farmers, who would benefit from the project, have expressed their concern that previous attempts to maintain the dam resulted in wasted expenditure, as millions of rands have been spent in the past for very limited results. Imagine that your company has won the tender to upgrade the walls of the dam, and you have been assigned to assess the risks for the project.

Required:

- (i) Describe the possible risks associated with a project of this nature, which are likely to impact the project negatively.
- (ii) Identify and explain one qualitative and one quantitative method of analysis that could be used to determine the impact of the identified risks.
- (iii) Discuss how you will minimise the impact of any two of the risks that you identified in the first question.

9.4 STAKEHOLDER MANAGEMENT

Stakeholder management is a systematic process of identifying individuals, groups or organisations that have a direct or indirect interest in the project, and developing engagement plans to involve these stakeholders in project decisions and execution processes (Project Management Institute, 2013: 391; and *Association for Project Management* 1, n.d.). It is important to understand the needs and expectations of the stakeholders, and to find ways to ensure that these needs are satisfied, which will encourage stakeholders to participate positively in project decisions and activities (Project Management Institute, 2013: 391).

The impact that stakeholders have on a project varies depending on the type of stakeholder, the nature of the project, or the stage of the project life cycle. Some stakeholders may be involved only in gathering data about the project, while others have a financial interest in the project. It is important for the project manager to monitor all stakeholders throughout the project life cycle and to resolve any issues that may arise. Sometimes stakeholders have conflicting objectives on the same project, which may make it difficult for the project manager to manage the project. The success or failure of a project is also dependent on how well the project manager identifies the conflicting interests and ensures that the project team members participate in a cooperative

manner to balance all stakeholder expectations in an appropriate manner (Project Management Institute, 2013: 30).

There are various types of stakeholders that you should know of. These include the project team, business owners, shareholders, customers, statutory and regulatory bodies, sponsors, the public, suppliers, and consultants (Project Management Institute, 2013: 394; and *Association for Project Management* 1, n.d.). It is important for you to understand that these stakeholders have different levels of influence on a project, as some are internal while others are outside of the organisation (Project Management Institute, 2013: 394).

In order to give you an in-depth understanding, we can look at the following examples of project stakeholders and their descriptions (Project Management Institute, 2013: 32; and Heerkens, 2002: 188):

- **Sponsor:** A sponsor is an individual, group or organisation that provides resources or financial support for the project. The sponsor can take part in promoting the project, from project conception to closure. The sponsor(s) may be internal and/or external to the project. Additionally, the sponsor can play a significant role in project decision-making, especially for decisions that involve a high risk. A project sponsor also helps to overcome problems that are beyond the project manager's or team's abilities to solve. This means that the project sponsor needs to be kept informed of all decisions made by the project manager or project team, either before or after they are made.
- **Customers:** Customers may include individual consumers or organisations that will acquire or use the end result of the project's product or service. For example, the customers of a new residential building are individuals who have paid the deposit for the apartment. Customers may be end users or resellers of the project's product or service.
- **Project team:** The size of the project determines the number of people who will work on the project. The project manager is directly or indirectly assisted by a team, who ensures that the project objectives are met. The team may consist of different individuals, who have different skills and responsibilities in the project. In order to achieve team effectiveness, the team needs to be focused on a shared vision.
- **Suppliers:** Suppliers are also called vendors or contractors. These are companies that provide components or services necessary for the project. Their services and products are usually supplied based on a written agreement or contract. Finding the right suppliers is very important for the provision of the right products, quality, time and quantities, and at the right place.
- **Project partners:** These are organisations that provide specialised expertise to a project. The project manager ensures that the selected project partners meet the required standards to offer the required services, before signing a project partnership agreement. Specialised services may include installations, training, lighting, waterproofing, tiling and plumbing.
- **Functional managers:** Individuals who lead a department, or are in charge of a function in the project, are called functional managers. Functional areas may include procurement, supply chain management, human resources management or finance. Functional managers have a responsibility to ensure that their functional areas are managed effectively.

- **Other stakeholders:** These include procurement entities, financial institutions, government regulators, subject matter experts, and consultants. Other stakeholders may also be individuals and groups that perform the actual work, and individuals and groups affected by the work (Association for Project Management 1, n.d.).



(Source: EDGE Learning Media (Pty) Ltd, 2020; adapted from Listful PM, 2015)

Figure 9.4: Project stakeholders

9.4.1 Engaging and influencing stakeholders

The project manager must ensure that stakeholders are managed appropriately, by engaging and influencing them, and by efficiently addressing any issues that may occur. There should be a continuously positive impact on the project from the stakeholders and resistance should be minimised, in order to achieve project objectives (Project Management Institute, 2013: 404). Stakeholders should be engaged so that they clearly understand the project objectives, benefits and risks. This will also help in influencing them to actively support project activities and decisions. In the project life cycle, the initial stages critically require more support from the stakeholders as compared to other project life cycle stages (Project Management Institute, 2013: 405).

In order to effectively manage stakeholders, you need to consider the following advice (Lester 2017: 37; Department of the Prime Minister and Cabinet, 2013: 2; and Project Management Institute 2013: 405):

- **Be able to identify them:** A project manager must be able to identify every stakeholder of the project. Not being able to identify them by name can cause unexpected negative impacts or changes to the project. Correctly identifying stakeholders helps the project manager to analyse them and determine their level of impact on the project.

- **Know their interest in the project:** The project manager should determine the stakeholders' levels of interest in the project. Some stakeholders stand to gain or lose significant financial investments based on the project's outcome. Other stakeholders, such as regulatory bodies, are more concerned with how the project runs.
- **Know their expectations:** In order to satisfy stakeholders' needs, the project manager should be able to ascertain their expectations. This can be done via a face-to-face meeting, through a survey, or by consulting expert opinions. If stakeholder expectations are beyond what the project can meet, then the project manager should find a way to communicate with them to reach a compromise.
- **Determine what you expect from them:** The project manager should be able to deduce and communicate what they expect from the stakeholder. For example, the project manager may expect the project team to report any shortage of resources as timeously as they can. These expectations should be explicit to the project team so that they are aware of what the project manager expects of them.
- **Know their priorities:** Knowledge of stakeholders' priorities will help the project manager when making decisions or communicating with the stakeholder. Usually, the determination of priorities focuses on schedule, cost, performance, and quality. These factors would be ranked in order of importance for each stakeholder.
- **Know how to communicate to them effectively:** The project manager should decide on the best communication method or technique applicable to each stakeholder. In some scenarios, face-to-face meetings may be effective, while in other cases, an email will suffice.
- **Determine the level of their impact on the project:** If a stakeholder does not support the project, the impact of their resistance needs to be determined. This helps to develop strategies that can curb the likelihood of a negative impact on the project.

Common challenges to effective stakeholder engagement

Even though there are strategies to manage stakeholders effectively, there also are common challenges that all project managers should be aware of. Let's take a look at some of the following challenges (Department of the Prime Minister and Cabinet, 2013: 3).

Inability to define the purpose of engagement

If the purpose of engaging with stakeholders is not clearly stipulated, it will be difficult for the project manager to identify the project stakeholder and manage their expectations. Therefore, the project manager should clearly map out the purpose of engaging with each stakeholder. This will enable them to identify suitable methods to engage with the stakeholder and benefit from their contributions.

Different levels of skills and experience of stakeholders

Stakeholders vary in their level of skill and experience, which can make it difficult for the project manager to manage them consistently. The project manager should vary their approach of engaging each stakeholder to make sure that the engagement suits their level of skill and experience. Some stakeholders may not have the necessary skills and expertise needed to ensure

project success, while others may be highly skilled and have more experience than the project manager. The project manager should use their interpersonal skills in order to effectively engage each stakeholder at the appropriate level.

Project complexity

A project that requires highly specialised knowledge may require various stakeholders with expert knowledge and skills to ensure its success. For example, a project for the building of a nuclear power generation plant will require specialised stakeholders to assist with achieving project objectives. However, managing specialised stakeholders can be difficult. The project manager must have appropriate management skills to coordinate the varied stakeholder skills, in order to enable project success.

Unfocused dialogue

At times, the project manager will chair stakeholder meetings, which requires the same interpersonal skills as mentioned earlier. An inability to discuss and find solutions to problems that are revealed during these meetings can lead to ineffective stakeholder engagement. The project manager should respond to important issues raised by the stakeholders, and decide how to proceed from there.

Failure to review and evaluate

The project manager must be able to review and evaluate any risks, proposed changes and stakeholder expectations. The engagement plan should enable the project manager to make rational decisions and be able to implement those decisions.

Strategies for success

It is important to understand that no single factor of performance can ensure ongoing effective engagement of the stakeholders. The following are some specific approaches that should help ensure fruitful and worthwhile stakeholder involvement (*Department of the Prime Minister and Cabinet*, 2013: 4).

- *Stakeholder mapping:* This involves identifying all stakeholders, as well as those impacted by the project, who will affect or influence the project. You should restrict the list of these individuals or groups in order to recognise stakeholder groups and subgroups, and document their priorities and influence level. The stakeholder mapping informs the participation strategies which should be updated as and when any changes occur. This enables the project manager to tailor engagements depending on their history and current concerns.
- *Planning the engagement:* The project manager must consider their engagement with stakeholders strategically and determine why each stakeholder wants to be involved, whether any problems have arisen from stakeholders, what the project seeks to achieve and how they will measure their goals. The project manager will need to develop an engagement plan that they will use when interacting with different stakeholders.

- *Mixed approach:* A mixed approach provides versatility to handle interaction gaps between stakeholders, which means that the project leader can limit interactions or deepen collaborations where appropriate. This strategy can include information, communication and cooperation activities with stakeholders, as well as incorporate resources such as discussion papers, public forums, one-on-one meetings and social media.
- *Learning from others:* The modification of a strategy must not mean reinventing the wheel. You, as the project manager, should find out who has previously done the same project, and use their knowledge and expertise in your own project. This route will encourage innovation and make interactions between the project manager and stakeholders more responsive and successful. You can also prepare for other issues by knowing the results of recent engagement with similar stakeholders, as well as how to deal with them in a new and more effective way.

9.4.2 Stakeholders' conflicting interests

Project stakeholders have varied project interests, and this can result in conflict between stakeholders. The causes of this conflict may include inadequate resources, project team rules and norms, ineffective communication, different personal work styles and uneven allocation of duties and responsibilities (*Project Management Institute*, 2013: 238). The project manager must be able to manage stakeholder interest in order to minimise any conflict that may have a negative impact on the project. Various techniques can be used to manage conflict of interest among stakeholders. It is important for the project manager to determine the following factors in order to find a suitable conflict resolution technique:

- The source of the conflict
- The urgency to resolve the conflict
- The significance and severity of the conflict
- The preferred/desired outcome for the individuals involved in the conflict

Let's look at the main causes of intergroup and interorganisational conflicts (*Moura and Teixeira*, 2010: 290).

The first cause is *cognitive differences* that arise from varying interpretations of empirical evidence by stakeholders. Different stakeholders may have different conclusions of the same findings, which leads to conflict. The available data may be incomplete or the facts may not be consistent enough to properly evaluate a situation. The project manager may overcome this through further studies to explain the facts, or by collecting extra and more reliable information. This can help to turn the dispute into an organised problem.

Secondly, *conflicts of objectives or interests* can arise, as some stakeholders may not agree to ratios of sharing costs or benefits. Sound conflict management techniques will be able to solve this conflict.

The third possible cause of conflict is *normative conflicts*, which arise from the difference in ethical or moral belief systems between stakeholders, and result from each stakeholder having different values and norms. The project manager should point all stakeholders toward the project objectives and advise them to focus on the project work.

Lastly, *conflicts of relationships* are a cause of conflict where personality- and behaviour-driven conflicts between stakeholders arise. An effective negotiation, mediation or arbitration process can solve conflict of this nature.

Resolution of conflict between stakeholders

There are various ways in which resolution can be reached between conflicting stakeholders, which are listed in this section (Moura and Teixeira, 2010: 302; and Project Management Institute, 2013: 283).

Abandonment

Abandonment may entail one of the stakeholders involved in the dispute deciding to take a step back. This could be because they are being passive, they believe that they will not win, or that they believe the outcome is not favourable. Abandonment or avoidance may not be considered a resolution technique, but the possibility of a stakeholder withdrawing from a dispute may occur.

Negotiation

This is the most common conflict resolution tactic, where the parties involved in the conflict negotiate a settlement that is favourable for both parties. The rules that are normally used in the negotiation to achieve consensus in conflict are fairness, efficiency, wisdom and stability. A facilitator can be used to help both parties reach an amicable resolution. The facilitator can make use of the following approach:

1. Help the two parties to focus on the problem and not each other
2. Focus on the reasons for their demands, rather than their positions
3. Find options for mutual benefit, rather than a win-lose outcome
4. Ensure both parties agree on the criteria used to reach consensus
5. Look for the best alternatives to reach a negotiated agreement

Mediation and conciliation

An independent third party can help both parties to understand each other's viewpoints, and also impartially assist them in finding solutions. Mediation and conciliation are terms that are used interchangeably, and they mean the use of facilitation and evaluation to help parties in disputes reach a resolution. The facilitator/mediator, or the third independent party, can make recommendations to both parties that can be used to reach a solution to the dispute.

Expert assessment

This is when both parties agree to seek expert assistance to reach a resolution. Once both parties agree to have the expert assessment, the decision made by the expert will be final. Usually, expert assessment is used in court litigation or in arbitration. In cases where the expert should be paid, both parties bear the fees. Although the expert opinion can be deemed final and binding, there

is still room for a party to perceive the judgement as unfair, and to challenge the ruling through arbitration and litigation.

Arbitration

Arbitration is a resolution procedure that is subject to statutory controls, and a private arbitrator is usually selected by mutual agreement. The arbitration is composed of three arbitrators – one representing each party and one who is selected by common agreement. The arbitrators should have the right qualifications and experience to carry out the arbitration process impartially. Witnesses or expert opinions can be sought during this process, in order to reach a resolution. Even though arbitration is voluntary, the final decision is binding.

Litigation

In scenarios where conflicting parties fail to reach an agreement using the resolution methods previously discussed, a court of law can be approached. Litigation is a term used for disputes that are dealt with by a court of law. Countries have different systems that they follow to handle disputes, depending on the nature of the conflict. After the court has done a thorough investigation, a binding ruling is made. The court is allowed to consult experts who will assist by giving an independent opinion.

Building bridges

Building bridges is a proactive approach to mitigate the need for conflict resolution. This is done through the anticipation of possible conflict among different stakeholders, by implementing strategies to avoid such conflict. Improving the quality of contracts and other project documentation is another way of eliminating the possibility of conflicts that arise from disagreement on contract terms. The use of independent quality assessors, preproject planning or precontract negotiations can help to avoid possible sources of conflict.

9.4.3 Stakeholder communication

Stakeholder communication is vital for the project manager to be sure of what the stakeholders' expectations are, and to devise methods to manage these expectations. Each stakeholder has their own communication requirements, which the project manager should use to decide how to communicate with them, when to communicate, and which mode of communication should be used. In order to ensure effective stakeholder communication, the project manager should adhere to the following guidelines (Project Management Institute, 2013: 288):

- Listen attentively
- Use probing questions to better understand the stakeholder
- Ensure that the project team is equipped with the necessary project communication skills
- Motivate and coach the project team to achieve the desired results
- Ensure you have the necessary negotiation and problem-solving skills
- Set and manage stakeholder expectations

Note: This list is not comprehensive, but contains some of the most important aspects of communication.

Benefits of stakeholder communication

Understanding the benefits derived from stakeholder communication will help the project manager to focus on the method of communication that they will use with stakeholders throughout the project life cycle. The following are some of the benefits of effective stakeholder communication (Linton, 2019; and Association for Project Management 2, n.d.):

- **Creates an open dialogue:** Inter-stakeholder dialogue should promote discussion. The project manager can gain a better understanding of stakeholders' interests and attitudes by setting up a forum or by inviting additional methods of feedback to improve the timelines and transparency of communication. Using forums or other forms of social media to communicate, the project manager can respond to critical issues and update all relevant parties. Communicating with other stakeholders through social media may also spread the message further and increase transparency.
- **Builds positive relationships:** Communication can allow the project manager to establish positive relations with stakeholders, such as the media or groups of special interest. Press releases, journalist interviews and meetings can create an environment of understanding between the project manager and the stakeholders.
- **Builds longer-lasting stakeholder relationships:** Communication with stakeholders on a regular basis builds not only positive relationships, but also strong, long-term relationships. Communicating regularly with stakeholders and creating a mutual understanding can help to build effective long-term relationships with key groups. There are a number of benefits to a strong relationship for you as a project manager. For example, having good communication with a manufacturer will allow you to create an effective supply chain, whereas good communication with shareholders will make it easier to access funds for current or future projects.
- **Improves stakeholders' understanding of the project objectives:** Lack of communication with stakeholders may make the project objectives vague, because the specifications and objectives of the project are derived from stakeholders. Constant communication with stakeholders helps them to understand the project objectives and their roles in the project. For example, communication with trade unions and employees helps to improve their understanding of the project goals. When the project affects the local community in your sector, then establishing contact with local governments, pressure groups and the community itself will help them to understand your project goals.
- **Influences stakeholders that have a higher impact on the project:** The project manager will concentrate their communication system on stakeholders that have the biggest impact on the project's performance. For instance, as a project manager, you could focus your communication on these groups, so that they take your views into account when governmental or industry regulatory bodies are considering legislation that may cause problems to your project.

Benefits of stakeholder engagement



(Source: EDGE Learning Media (Pty) Ltd, 2020)

Figure 9.5: The benefits of stakeholder engagement

9.4.4 Change management

During the project life cycle, it is necessary for the project manager to be aware of possible changes that may be needed. The changes are usually small deviations from the original project plan, but they can also be significant if risks are not accounted for properly. The changes may be necessary to control possible risks, such as delays in the delivery of raw materials, or any number of unforeseen circumstances. The project manager needs to carry out an assessment of the circumstances that would warrant the adjustment of the project plan (Lester, 2017: 99). Possible guidelines that a project manager should adhere to when making changes include the following:

- Only authorised team members should make the necessary changes after the necessary assessments have been done
- The changes should be made with caution, and no unnecessary changes should be made
- Schedule, cost, performance, and quality should be considered when making any changes
- The originator should be made aware of important or major changes and their implications
- The impacted parties should be made aware and compensated where necessary

Changes that result in negative effects on the project are not often supported by customers, as they will likely increase the overall project cost, so it is important to evaluate whether the change is necessary. The project manager must issue a notice of contract scope to all affected departments, in order for them to determine the quality, cost and time implications of the change. Once each department has indicated their quality, time, and cost estimates, a final decision will need to be made, in consultation with the project sponsor and other concerned stakeholders. The project documentation will also need to be updated across all relevant departments.

9.5 PROCUREMENT MANAGEMENT

The Project Management Institute (2013: 355) defines procurement management as the process of acquiring raw materials, which include products or services, for the purpose of using them to achieve project objectives. Procurement management involves deciding on which outside services to use, which products to acquire, which suppliers to use, how long the term of use will be, and any other terms of a contractual agreement with a supplier.

The procurement management process involves legal documents, such as contracts, which are formal agreements between the buyer and the seller (Project Management Institute, 2013: 355). In a contract, the buyer (i.e. the project team or project manager) states that they will offer compensation in the form of monetary terms for the products or services that will be rendered by the seller (i.e. the supplier). For this purpose, a procurement contract is drafted, which details the terms of the transaction between the buyer and the seller. Organisational procurement policy usually specifies who is authorised to sign or approve the terms of the contract, and also details how the payment must be processed.

Once the contract is signed, it is legally binding, meaning that it can be used in a court of law if one party fails to honour the terms of the transaction. It is important for the project manager to ensure that the contracts are thoroughly reviewed, and that approval is obtained from the relevant stakeholders before any documents are signed. Procurement management may also involve managing multiple contracts with different periods of effect – in other words, some contracts will be for a single purchase, while others may be recurring or batch-related. A database of all these contracts needs to be kept and managed effectively. Depending on the type of contract, some contracts can be modified for renewal purposes once their life cycle elapses. The project manager should ensure that the contracts are properly worded and that they cater for potential risks that may occur. In the contractual agreements, the seller may be a contractor or subcontractor, or a vendor or supplier. The buyer can be the client, customer, contractor, purchasing organisation or service requester.

9.5.1 Objectives of supplier management

Suppliers play an important role in any project, as they provide the raw materials necessary to accomplish a project. It is important for the project manager to ensure a good relationship with suppliers, because ineffective supplier management can result in project delays or a supplier being uncooperative with project timelines. Suppliers should comply with project requirements, which is why they should be engaged throughout the project life cycle (Invensis learning, 2018; and Patowarya, 2018). The following points are some of the supplier management objectives that a project should have:

- To develop and maintain a good supplier relationship
- To monitor and appraise supplier performance, based on supplier policy, on a regular basis
- To negotiate and agree on contract terms that give maximum value for money to suppliers
- To develop and maintain a supporting database for supplier contract management

9.5.2 Cornerstones of successful relationships

Relationships with suppliers and other stakeholders should be managed effectively. The project manager should pursue profitable relationships, and eliminate or manage costly relationships to minimise their impact on a project. Although there are no benchmark methods to maintain successful relationships, the following are features of successful relationships (Sparrow, 2005).

Trust

In order to build or maintain successful relationships, trust should be built. You can earn trust by being honest and transparent, and by following through on your words with appropriate actions. You also need to uphold contractual commitments, because once there is mutual trust between the project team and project partners, it enhances the longevity of the relationship.

Finding win-win solutions

Pursuing a collaborative relationship that benefits both parties is key to building strong relationships. For example, changes that may need to be made on the project plan should not disadvantage another department or individual. The losses and profits need to be shared equally, or as agreed upon, between parties.

Fostering good and effective communication

An inability or unwillingness to share information and communicate effectively can be a detriment to successful relationships. The project manager needs to ensure that information is shared with the correct stakeholders and that they have understood the meaning as intended. Asking for feedback is a way to find out if the recipients have understood, and whether you are building a strong bond with them through this communication.

Criticising only when necessary

Criticism should be given sparingly. The project manager should ensure that all forms of criticism are constructive. Problems or conflicts that arise need to be handled only after the relevant team members clearly understand their source. Successful relationships strive to provide constructive criticism.

Fostering realistic expectations

Unrealistic expectations can lead to unsuccessful relationships. The project manager needs to discuss their expectations with the concerned parties, and mutual understanding should be reached. This avoids any conflicts that may arise if expectations are not met. In the same way, the stakeholders' expectations should also be discussed, so that the project team is not strained in trying to achieve unrealistic standards.

9.5.3 Communication essentials

Effective communication is an important element of the project life cycle. Whether it is an email, telephone call, meeting or memo, using the most appropriate communication method for the context is what makes communication effective (Heerkens, 2002: 210). The following items are possible factors to consider when communicating.

Consider the purpose of the communication

Considering the purpose of communication helps you to decide what to communicate, and also to choose the correct medium to use. The purpose of the communication guides the whole communication process.

Be concise

Communicating too much information may cause the receiver to misinterpret your message, or the meaning of the communication may become diluted. You must think through what you want to say and decide how best to make it short and precise.

Use correct punctuation

Particularly for written communication, you must check the grammar, spelling and sentence structure of your message. There are various software programs that you can use, such as Grammarly, to check for grammar or spelling errors. Poor sentence construction can lead to miscommunication.

Avoid using jargon

Avoid using jargon, especially words that are not commonly used in everyday communication. It is important to use language that is known to the person you are communicating with.

Get feedback

Asking for feedback will ensure that the recipient has understood your message, and can help you to clarify the meaning of a message if something is not understood. Feedback in communication is important, as it enhances the effectiveness of the communication.

Eliminate distractions

Distractions can get in the way of effective communication. You must choose the right method and timing of communication in order for your message to make it to the intended party. Noise, for example, can be a distraction when speaking face to face. You should choose an environment or mode of communication that allows the receiver to clearly understand what is being communicated.

Methods of communication

Once you decide on the best communication approach, you will need to choose the best mode of communication to use. You can also use one form of communication in conjunction with another (Heerkens, 2002: 205). The following are some of the methods of communication that you can use:

- *Email or text message:* Email is the most widely used form of written communication, and you need to adhere to correct email etiquette in order to foster effective communication. Emails should be carefully worded and concise.
- *Telephone:* Telephone calls allow you to use your voice inflections when communicating, as compared to a written form of communication where tone cannot be conveyed easily. You are also able to receive immediate feedback when communicating via the phone. However, phone calls still do not allow the people involved to see non-verbal communication, such as body language.
- *Memos and letters:* These methods are now reserved mostly for official communication. You will need to decide when a memo or letter is appropriate to use; for example, when announcing changes in company policy, you can use memos.
- *Meetings:* Meetings can be used for formal or informal communication. Their main advantage is that they allow face-to-face communication, which also allows for immediate feedback. The people involved in the communication are able to hear the communicator and also see their body language, which enhances the effectiveness of communication. In meetings, you can also use visuals and demonstrations to promote understanding.
- *Remote updating through project management software:* Project managers are using this method of communication increasingly, in order to communicate project statuses and also link with other project teams that are geographically dispersed.



EXERCISE 9C

- Assess the importance of managing any changes to a project.
- Describe how a project manager can ensure effective communication in a project team.
- Discuss two conflict resolution methods that are used to solve internal stakeholder conflict.

9.6 REVIEWING THE EXECUTION PHASE

The planning phase involves specifying project objectives, resources needed to achieve the objectives, and who will be responsible for the various tasks and the project processes, such as lines of communication, approval processes and timelines. The execution phase, however, entails implementing these set project plans. The end result of the execution phase is the product or service to be delivered to the customer for approval (Orangescrum, n.d.).

The execution phase is usually the most lengthy part of a project, as it involves following through on the project plans. Tasks need to be performed on time and according to the description in the project plan, and the resources also need to be utilised accordingly. Possible challenges should be discussed, and the right individuals with the ability to make decisions should decide how to handle those challenges.

During the project execution phase, the project manager can make use of project management processes to monitor and control the project, in order to ensure that there are no deviations in terms of the time, cost, quality and risks. Moreover, these processes should help the project manager to manage the project stakeholders, procurement and communications (Orangescrum, n.d.). To achieve a successful project execution, the following actions should be performed:

- Selecting and managing a project team
- Allocating and managing resources
- Monitoring and managing risks
- Managing contractual agreements
- Managing project communication channels
- Monitoring, controlling and implementing approved changes
- Managing stakeholder expectations
- Performing quality assurance processes

Project execution processes

The following processes are involved in the project execution phase (Hassib, 2012; and Orangescrum, n.d.).

Execution kick-off

Once all activities have been prepared, including the approval of the plans, functional requirements and project funding, the project team may begin to work on the execution activities.

Acquire project team

The project manager takes appropriate steps to secure the necessary human capital, in order to complete the project. Calendars for resources are defined, and the deployment of resources for the project is allocated according to contracts or agreements with the business units, functions or resource group managers involved.

Develop project team

In order to ensure that each team member has the right competencies for each step in the project process, the project manager reviews all individual competencies. Project managers who can match their vision and collaborate with their teams can execute key initiatives and projects successfully. By achieving harmonisation of the business's vision with the project plan, the project manager will be able to close the gaps caused by individual competencies.

Execute the project management plan

The project manager carries out the project management plan by executing the activities of each sub-plan, including the communications plan, risk management plan etc. The project manager will direct all the different technical and organisational resources available to the project, in order to accomplish the planned project work.

Conduct project status reviews (PSRs)

Project status or work-in-progress meetings help project managers determine the status of team members. The project manager evaluates the work performed to date, and compares it to the planned work of the project. Project managers are then able to evaluate existing problem areas and project risk areas, and communicate important project knowledge with immediate feedback. These project status meetings also eliminate the communication problem arising from the assumption that all team members are informed and competent where the project work is concerned. Team members do often take the time to learn, as they are interested in their own projects. The execution phase of the project will reveal unexpected problems or challenges and, therefore, project managers must be prepared to identify and implement changes.

Update project plan

In most organisations, the project management team is responsible for updating the project plan. The project plan is a record of the activities in the project, but it is also a reference document for the order that tasks should be performed in, how the team should report their progress, and much more. Project reports concentrate on three possible drawbacks: complexity of project management, cost and time. Any adjustments or improvements to the previously defined plan, together with audit history details for the audit trail, must therefore be properly documented and approved by the appropriate parties. Any delay in maintaining the precise plan, or providing an outdated one, can also impact overall project success.

Quality assurance

Quality assurances are performed throughout the project cycle. Quality assurance is the auditing process for quality standards, and the results of quality control measurements, in order to ensure the use of appropriate standards for quality and operational definitions.

Acceptance of deliverables

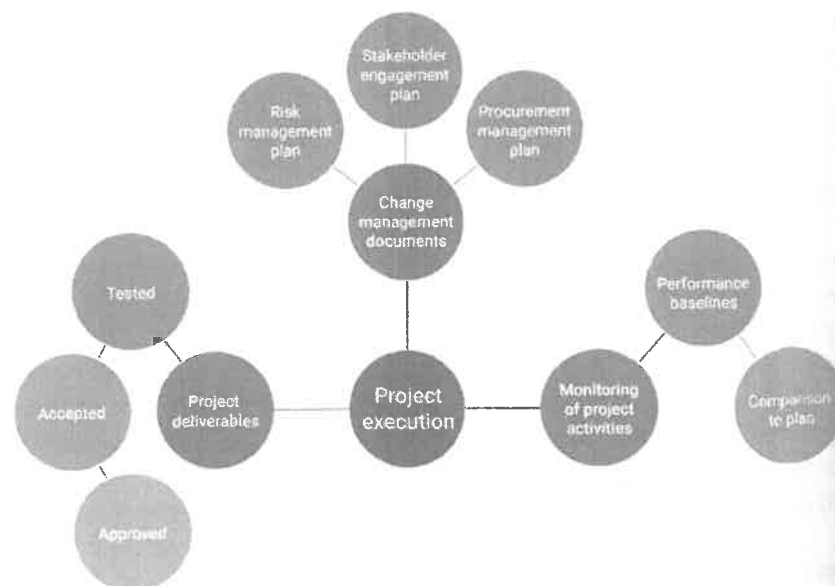
The acceptance requirements for the project deliverables set a standard for performance or ability, which the user accepts, in advance, for the specific deliverable. The project planning phase develops the performance plan, which establishes the project goals and acceptance criteria. When the customer agrees to accept the deliverables in their current state, the execution process ends. A single deliverable may, in some cases, not satisfy all acceptance criteria for the project. However, it must fulfil the particular specifications that it is designed to meet. In other words, a deliverable can be a part of a larger project delivery, but each deliverable must meet its own specifications.

Every deliverable must be authenticated by the customer, who would be able to recognise any remaining problems, which will then allow the project manager to address these problems.

Complete execution phase review

In order to record and share any lessons learned during the implementation process, the manager contacts all participating parties. A formal *phase review analysis form* is completed, and submitted for approval to the project sponsor. This is done to approve that the next step should begin, and that the current process should be closed. All of the related plans and documents are reviewed (including any pending issues), accepted, approved, and then reported, together with their resolution plan.

Project execution outputs



(Source: EDGE Learning Media (Pty) Ltd, 2020; adapted from Orangescrum, n.d.)

Figure 9.6: Results of project execution

The execution phase produces the following outputs/results:

1. **Project deliverables:** Project deliverables are tangible and intangible expectations produced by a project, and are the main reason that projects are run. During the execution phase, it is imperative to test deliverables, in order to ensure that they meet the desired customer and sponsor expectations and specifications.
2. **Change management documents:** Change is inevitable in project management, which means that the project plans will also need to change with the project. Implementing change plans should keep the project on the correct path to achieving the project

objectives. Change management documents detail how change should be managed, and can include:

- change management goals, which clearly articulate change needs that were identified, evaluated and approved (benefits derived from the change should also be explained);
- change management responsibilities, which detail the responsibilities of various parties involved in the change process; and
- change management models, which detail the change management process, such as who authorises changes, procedures to be followed and protocols to be observed.

3. **Measurement of project activities:** Project execution also involves measuring each project activity to ensure that it conforms to the set standards and requirements of the project plan. Measurement of project activities helps to determine any deviations from the project plan or performance standards. Project controls are used to ensure that deviations are eliminated or minimised.

9.7 PROJECT MANAGEMENT IN PRACTICE

The following is a practical example of a project. Read through this example in order to understand how the theory you have learned is put into practice.

The eKhaya Neighbourhood Improvement Program

Background and objectives

The district of Hillbrow was established as a residential extension to Johannesburg in the late 19th century. It was identified as an entry point neighbourhood for immigrants due to its favourable, central location. During the 1950s and 1960s, a property boom led to extensive high-rise building developments in the area, making it only second to Hong Kong in terms of residential density at that time.

In the 1970s Hillbrow was a prosperous, designated whites-only area. In 1978, under Apartheid, the Rental Control Act was lifted and landlords could now charge new tenants market rents, this resulted in a massive exodus of European migrants, the beginning of "white flight" from the city. The escalating violence in other townships of Johannesburg, together with the abolition of the Rental Control Act, led many colored and Indian people to move to Hillbrow. By 1980, the racial composition of the district had changed, leading the City of Johannesburg administration to declare Hillbrow a "gray area", where people of different ethnicities lived together. Rising rents forced tenants to sublet, causing over-crowding in poorly maintained buildings.

Subsequently, Hillbrow suffered from urban degeneration, over-population, unemployment, poverty, drugs, homicides and violence combined with many derelict buildings and by the 1990s the district was classified as an urban slum.

The objectives of the eKhaya Neighbourhood Improvement Program include:

- Improving the living environment
- Increasing social housing programs, systems and support
- Activating local government interventions in the public realm (streets, alleyways, etc.)
- Attracting private sector investment in building and management services
- Changing resident perception of the area

Size and population development

Johannesburg has roughly doubled in size since the end of apartheid in 1994, with a population of around 5.5 million people in 2018. In addition to the city proper, the larger metropolitan area is home to 9.6 million people, taking up most of Gauteng province. The city itself is set to expand by another two million people by 2035.

Population composition

Of those living within the Johannesburg's city boundaries, they are 64% black, 14% white, 14% coloured and 7% Asian. The segregation policies of apartheid led to different suburbs, like Soweto and Lenasia, having very different compositions. The most spoken first language is English, at 31%, followed by Zulu with around 20%. Johannesburg sports a young population, with around 42% of people being under the age of twenty-four, and only 6% over sixty. There are strong rich/poor divides, following the deep socio-economic divides from the history of colonialism and apartheid, high levels of unemployment and many people living in settlements that lack central municipal services.

The district of Hillbrow was established as a residential extension to Johannesburg in the late 19th century. It was identified as an entry point neighbourhood for immigrants due to its favourable central location. During the 1950s and 1960s, a property boom led to extensive high-rise building developments in the area, making it only second to Hong Kong in terms of residential density at that time.

Implementation

By initiating the Neighborhood Improvement Program in 2004, The City of Johannesburg administration sought to dispel the notion that Hillbrow, and in particular eKaya, as a violent, no-go area by creating a liveable neighbourhood characterised by safety, cleanliness and friendliness, the three principles underpinning the initiative.

Beyond changes to the physical improvement of the area, the project sought to break the fear associated with "grey areas". From the outset, the initiative used social capital as the basis of transformation and physical regeneration. Social capital was promoted by bringing together different stakeholders – property caretakers, for-profit and not-for-profit property owners, tenants and the city administrators – and encouraging them to talk to one another on a regular basis, creating positive relationships.

The first critical phase placed emphasis on community mobilization. Following the purchase of properties by the Johannesburg Housing Company and Trafalgar Property Management, JHC's housing consultant and community organiser initiated the 'Know Your Neighbourhood' campaign with the help of property caretakers. The cost for this phase was approximately ZAR 500,000 (approximately USD 35,000).

Aimed at breaking down barriers and fostering familiarisation among residents and stakeholders, the campaign involved neighbourhood scanning in the form of walkabouts. This led to active mobilisation of the housing managers and/or property caretakers around building issues, and the establishment of a housing manager forum. Following the mobilisation of the key stakeholders, primarily building managers – who identified crime, grime and violent New Years' Eve celebrations as the immediate challenges – a voluntary association was set up and an executive committee was elected. As a result of these steps, property owners agreed to the payment of monthly levies of ZAR 24 (USD 1,70) to mitigate the challenges identified. The successful mobilisation of property owners generated a monthly income of ZAR 6400 (USD 450).

The second phase emphasized 'bottom-up physical regeneration'. The monthly levies from the property owners enabled the eKhaya executive committee to introduce a security and street cleaning project called 'Our Clean eKhaya Neighbourhood' by contracting Bad Boy'z Security (a private security services provider) to work with Pikitup (a city refuse removal institution) – to clean the streets around member buildings. The levies also facilitated the start of the public space upgrading and management, which was supported by public agencies including the Johannesburg Development Agency (JDA). The first public spaces to be upgraded were derelict pavements and the grimy sanitary lanes, were cleaned and made secure.

The third phase involved community development and further attempts to foster the notion of friendliness in the eKhaya neighbourhood and the Hillbrow district. This was accomplished through social cohesion programmes such as the annual children's program, the eKhaya Street Soccer concept, and the eKhaya Kidz' Day event, which were largely driven by the precinct's property caretakers.

Financing and resources

The lead agencies for the project are The City of Johannesburg and the Johannesburg Housing Company. The City of Johannesburg is responsible for capital investment in streets, lighting, lane upgrades and the renovation and upgrades of the eKhaya park and other public spaces. The Johannesburg Housing Company and Trafalgar Properties provided the seed funding as well as providing administration and general logistics support. Membership levy fees also contribute to the ongoing upkeep on buildings.

Project activities such as children's recreational and social cohesion programmes all require some level of resourcing. Generally, these are financed from a combination of other sources:

- sponsorship by way of cash or in-kind support external grant fund raising including from the municipality

- contribution from service providers
- volunteer work from people involved in activities
- tenant and member fund-raising activities
- small entrance fee for participation

Results

The eKhaya project has helped to achieve the following outcomes:

- regeneration of the physical quality of the neighbourhood
- increase in the sense of security and wellbeing of its residents
- generation of increased private and public investment in the area
- stimulation of social cohesion and positive community involvement
- making the eKhaya neighbourhood a positive-place-to-live for tenants
- After years of extensive mediation and lobbying with the city administration, a site once abandoned to drugs and crime was reclaimed and upgraded into a recreational space for children, named eKhaya Park. The city administration invested ZAR 7 million (USD 500,000) in the park and provides on-going maintenance and gardening services.

'Our Healthy eKhaya' and 'Safe New Year' campaigns, largely driven by the property caretakers, involve the display of posters discouraging violent and chaotic behaviour. This has resulted in peaceful festive celebrations in the area since 2004, and residents now take more ownership of internal and external spaces. Businesses and retail franchises are slowly returning to the area and will provide employment opportunities moving forward.

The implementation of the eKhaya project has led to a significant drop in crime and grime, both within and outside eKhaya member buildings, and has created a more liveable environment. In a 2016 survey on the impact for tenants, the general response was that eKhaya had positively impacted on their quality of life and livelihoods.

Barriers and challenges

The eKhaya Neighbourhood Improvement Programme has ensured that a large part of the Hillbrow district is safe, clean and an inviting place to live, however ongoing social challenges remain in some sections of the district including:

- "hi-jacked" buildings
- drug use
- unemployment and poverty
- aging engineering services
- fragmented institutional structures

Lessons learned and transferability

The eKhaya project demonstrates that solutions to urban problems cannot only be devised by city administrators, but can also be generated by residents and business owners and operators.

The eKhaya neighborhood is managed by a consortium of public agencies, private sector and community actors. It demonstrates the power of mobilization to actively engage residents – those who own property and those who do not own property – by giving them a voice in urban regeneration efforts of the district.

While most urban regeneration initiatives lead to gentrification and the exclusion of low-income residents, the eKhaya project is flexible towards informal and street trading and subletting. These practices are often seen by city officials as illegal by contributing to urban disorder, however, they are imperative to making the city inclusive to the urban poor.

(Source: urban sustainability exchange, 2017)

9.8 SUMMARY

Risks are unavoidable in a project. We have discussed that the project manager should be able to identify risks, analyse them and decide how to minimise or eliminate their impact on a project (in consultation with the relevant stakeholders). Furthermore, the project manager should monitor and maintain project stakeholder relations throughout the project life cycle. Stakeholders' interests and expectations in the project should be understood and managed. The project managers should also communicate their expectations of particular stakeholders. Effective communication skills are necessary for the project manager and the project team. We also mentioned that, in order to achieve project objectives, it is important to have good relations with suppliers. Relating to this, the procurement management plan should clearly detail how to manage suppliers, the policies to be used and the procurement protocol. A well-detailed project execution ensures the achievement of project objectives, which is why the project execution plan should help give clarity to relevant stakeholders on the direction of the project and how it will be achieved.

PART 5

PROJECT MONITORING AND CONTROL AND PROJECT CLOSURE

Part 5 comprises the following three units:

Unit 10: Project monitoring and control

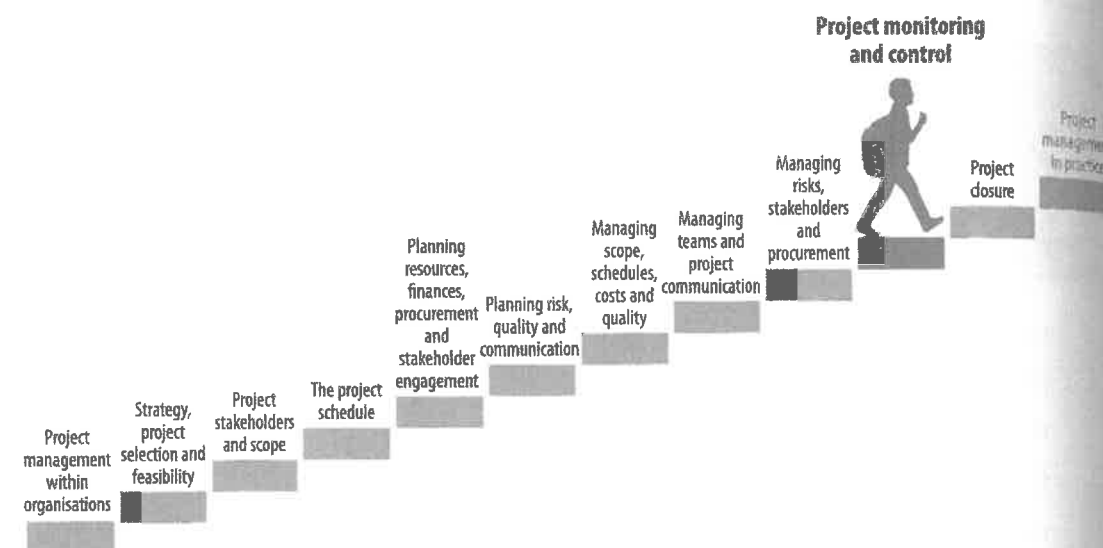
Unit 11: Project closure

Unit 12: Project management in practice

10

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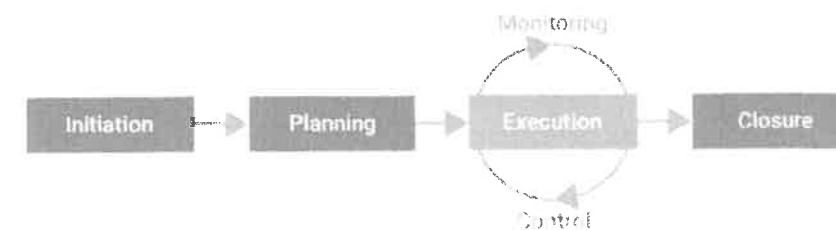


10.1 INTRODUCTION

Imagine that your country is at war with one of its neighbours. Your military general determines that the defence force needs to knock out its enemy's strategic command headquarters. However, the command centre is not positioned in a fixed location – it is essentially a large, mobile caravan that can move as and when required. There are two weapons in your arsenal that you could use to destroy this strategic facility: a long-range cannonball, and a precision-guided missile. If the cannonball is fired, you can monitor its flight, but you cannot control its trajectory once it has been fired. Whether or not the cannonball will hit the target depends on your assumptions about ballistics, wind speed and direction, as well as other variables; it also rests on the assumption that the target is fixed. With the guided missile, you can adjust its flight in response to changing wind conditions or an unexpected change in the target's position. In short, the guided missile has a far greater chance of hitting the target and achieving your goal (Russell et al., 2019).

Do you think your project will unfold with perfect precision, in line with your plan? While you may be an optimist and have written detailed plans, the reality is that things seldom go according to plan. There are various risks that can drastically change your project. As the project progresses, conditions change. The project's objectives and scope may also change. A successful project manager makes provision for unexpected events that arise during the course of the project, and is always ready to correct the course to hit the planned target. In circumstances where the target changes, or it is no longer possible to attain the target, the project manager makes the necessary adjustments and updates the original project management plan with these changes. Projects can deviate from the plan for a number of reasons, such as late deliveries from suppliers, a key stakeholder falling ill, or the customer suddenly requesting a major new feature to be incorporated into the software being developed.

In the previous three units, we covered the execution phase of the project. This unit covers the next phase, monitoring and control, which coincides with the execution phase (monitoring and control activities take place at the same time as execution-phase activities). The following figure outlines how project execution is monitored and controlled, where necessary, in a continuous cycle.



(Source: EDGE Learning Media (Pty) Ltd, 2020)

Figure 10.1: Monitoring and control phase within the project life cycle

You will recall that the project plan is carried out during the execution phase, and all planned work is performed. However, we cannot assume that everything will go according to plan. You will need to monitor project performance against your plans in order to determine whether actual performance (e.g. schedule, costs, quality of deliverables, milestones, scope etc.) is in line with planned performance.

For the project to be controlled, project performance must be measured appropriately, in the form of metrics or key performance indicators (KPIs). Where performance variances arise, you will need to make suitable adjustments to get the project back on track so that the original plan is achieved (Barron and Barron, 2019). If deviations from the plan are not identified and fixed, the project's objectives will not be attained. As the project manager, you should regularly update stakeholders with information on the project status and any changes that occur. The purpose of monitoring and control is to identify and address deviations from the plan, to ensure that the project's objectives can be attained (European Commission, 2016). Monitoring and control help to keep the project on course and deal with problems that threaten to disrupt project plans. By attending to project variations as they arise, the project manager can prevent small problems from becoming bigger problems, which can threaten project success (Burke, 2018).

Knipe et al. (2017: 208) point out that control does not fall within the sole domain of the project manager – each member of the core project team should provide assistance and input by evaluating their own performance, sharing performance data and issues with the project manager, and solving problems that could derail project success. Team members (such as software developers, business analysts and testers) provide the project manager with information on how they are progressing relative to the planned schedule, and how much this work has actually cost to date. Team members should also be consulted for advice on what corrective actions to take. In this way, valuable input is collected and the team's commitment to project success remains high (Clements and Gido, 2012: 303).

A formal definition of the monitoring and controlling phase helps to clarify which activities fall within its bounds and which do not. Monitoring and control can be defined as follows:

Overseeing all the tasks and metrics necessary to ensure that the [...] project is within scope, on time, and on budget so that the project proceeds with minimal risk. This process involves comparing actual performance with planned performance and taking corrective actions to yield the desired outcome when significant differences exist. (Russell et al., 2019)

It is evident from this definition that the function includes tracking project activities relative to the plan; monitoring performance metrics relative to planned performance outcomes; communicating and reporting on project performance; checking that the project remains within the bounds of the triple constraint of project management (costs, schedule and scope); dealing with risks and issues to ensure the project remains on target; and enacting remedial actions to get the project back on track, in line with the project plan.

Project control should not only be exercised after problematic issues have arisen. Where possible, control should be proactive (happen before) rather than reactive (happen after). It should anticipate predictable problems and put measures in place to prevent these problems from occurring (*Lumen Learning* 1, n.d.). This is a preventative approach to problems that can save the company time, effort, costs and much frustration. Preventative actions deal with potential problems, whereas corrective actions deal with existing problems (Russell et al., 2019: 55). Potential problems can be viewed as risks, while existing problems can be viewed as issues. Where project conditions or the scope change to such a degree that the original plan is no longer viable, the original baseline needs to be replaced with a revised plan to accommodate the change in circumstances (Larson and Gray, 2013: 455).

Effective control relies on accurate and timely data, as well as on a thorough analysis and proper interpretation of the data. What kinds of data should be measured and monitored? According to Russell et al. (2019), project managers should monitor and report on the:

- current status of the project against the planned schedule;
- current cost status of the project relative to the budget;
- anticipated final project cost;
- anticipated date for completing the project;
- existing problems (or issues) and their potential impact on the project;
- problems that are expected to arise and their predicted impact on the project;
- reasons for the project being behind schedule; and
- reasons for exceeding budgeted costs.

Larson and Gray (2013: 453) explain that effective control relies on the use of metrics. In other words, the data should be measurable. If you cannot measure it, it is likely that this area of the project will be difficult to control. The authors provide some examples of useful measures

regarding the actual time spent on each of the different project tasks, resource rates, and actual costs to date. These should be compared against planned activity durations, resource usage and budgets. The *Project Management Methodology Guide* (European Commission, 2016: 55) states that scope, schedule, cost and quality are important project dimensions that should be measured and closely monitored. Additional aspects that require careful monitoring and management are issues, risks, outsourced work and deliverables.

According to Larson and Gray (2013: 454), the monitoring and control process comprises the following three steps:

1. Measure performance and progress (relative to the baseline plan)
2. Compare actual performance against planned performance
3. Take action if the deviation from the plan is significant

During the monitoring and control phase, several documents need to be updated to incorporate the latest information. These documents include the risk and issue logs, the change log, and the project management plan (European Commission, 2016: 55). For instance, as soon as new issues arise, these should be incorporated into the issues log. Similarly, if a new task needs to be performed or if a task's duration needs to be extended, the project plan should be updated accordingly. In addition to incorporating changes into project documents, the project manager needs to distribute the monitoring information gathered to relevant stakeholders. The format and frequency of these reports will be defined in the communications management plan.

This introduction has served to provide an overview of the monitoring and control phase of the project life cycle. In the remainder of the unit, we will delve into the specific monitoring and control activities as they apply to the various key aspects and performance areas of a project.

After studying this unit, you should be able to:

- evaluate the importance of effective scope monitoring and control;
- discuss the purpose and processes of project schedule monitoring and control;
- outline the elements involved in resource monitoring and control;
- explain the importance of effective financial and quality monitoring and control;
- discuss the purpose and processes of risk monitoring and control;
- unpack the principles of communication and stakeholder monitoring and control;
- explain the process of reviewing the project monitoring and control phase; and
- apply your knowledge of project monitoring and control processes to both fictional and real-life cases and scenarios.

There are nine elements that need to be closely monitored and controlled: scope, schedule, resources, finances, quality, risk, communication, stakeholders and procurement. The following figure includes representative icons for each of these elements.



Monitoring and control

(Source: EDGE Learning Media (Pty) Ltd, 2020; and Shutterstock.com)

Figure 10.2: The elements of monitoring and control

10.2 KEY TERMS AND DEFINITIONS

The following key terms and definitions are applicable to this unit:

- **Contingency plan:** An alternative approach for the realisation of project goals in the event of an obstacle that threatens project success.
- **Controlling:** Actions taken in response to deviations from the project plan (as revealed by monitoring data) in order to keep the project on track and meet project milestones.
- **Crashing:** A method of getting the project back on schedule by allocating more resources to it. This could be in the form of overtime work, adding more people to the project, or providing more equipment (e.g. computers).
- **Earned value management (EVM):** A mathematical technique for establishing how well the project has performed to date by calculating the difference between actual value achieved and planned value.
- **Fast-tracking:** A technique to speed up project progress by performing activities in parallel which were originally planned to be done in sequence. This can only be employed if the activities are not dependent on each other in the sense that the one activity can only begin after the other activity has been completed.
- **Issue:** A known problem (unlike a potential problem or risk) that needs to be addressed in order to facilitate project success.
- **Key performance indicator (KPI):** A metric used to determine project progress and performance. Measurement (by way of KPIs) enables the data analyst to compare actual or current performance (e.g. time spent, money spent and resource usage) against a standard or plan to establish whether or not the project is on track to achieve its objectives.

- **Monitoring:** The collection of data on project progress, and the sharing of this data with the project team and other project stakeholders, thus enabling informed decisions to be made.
- **Scope creep:** An enlargement of the project scope without any corresponding extension to the project timeline (schedule) or budget. When project changes are introduced without any formal change-control process to investigate their impact on project schedule and budget, we can say that the change is not being properly managed.
- **Threat:** A potential hazard that could jeopardise project success. Not to be confused with 'risk', which, in its strict sense, refers to a combination of the probability and consequences (degree of severity) of the threat materialising.

10.3 SCOPE MONITORING AND CONTROL

In this section, we will look at the reasons for scope changes, the consequences of such changes, the dangers of scope creep, and the proper change-control procedures to be followed. However, let's first briefly revise the meaning of scope, scope management and scope control.

The *scope* of a project defines what work will be carried out and what product or service will be created, given the time, budget and resource constraints (Tasmanian Government, 2011: 22). There are two types of scope: product and project scope. *Product scope* refers to the features and functions that will be included in the product or service delivered. *Project scope* details the work that will be performed in order to create the product or service, and establishes a limit to distinguish this from work that the project will not perform (Knipe et al., 2017: 74). These aspects are formalised in the project scope statement, which provides a baseline (to the project scope), enabling project team members to determine whether or not a client's change request falls within the boundaries of the project (Singh et al., 2015: 865). In this way, it helps to avoid a situation called 'scope creep', whereby project stakeholders attempt to add new project outputs without allowing for extra time, budget or resources (Tasmanian Government, 2011: 28).

Scope management defines and controls what work is included and not included in the project (Knipe et al., 2017: 73). *Scope control* involves monitoring the status of the project in relation to its defined scope, as well as dealing with client change requests that impact the scope baseline (Singh et al., 2015: 865). A scope change is 'any modification to the agreed-upon project scope, as defined by the approved work breakdown structure (WBS)' (Knipe et al., 2017: 89). When these scope changes are encountered, a formal change-control procedure is typically required to ascertain whether or not the change should be incorporated into the current project. We will discuss the change-control process a bit later. For now, let's turn our attention to the impact and consequences of changes to the project scope.

Consequences of scope changes

The project scope is closely interrelated with other key project areas, such as the schedule, budget, resources and quality. Changing scope will influence these other variables, and the consequences of making scope changes therefore need to be carefully considered.

Knipe et al. (2017: 89) state that 'scope changes often require adjustments to cost, time, quality, or other project objectives'. An increase in scope can mean more work, which pushes out the project schedule. Is the client willing to allow more time for the project to be completed? More work can also mean that more resources are needed, which will raise project costs. Is the client prepared to provide more funding for the project? Adding additional features or functionality to a software system without making provision for additional time can result in a low-quality final product that the customer is unwilling to accept. New change requests can also impact the amount of inspection that needs to be performed by the quality-assurance department once the project is completed. Other scope changes could necessitate the recruitment of highly skilled staff with associated cost implications. Risks can also be raised in the face of scope changes, leading to potential project failure. The project manager (and project sponsor) needs to consider whether they are prepared to face these risks.

These examples highlight that the project manager needs to see the project as a system with closely connected components. Making changes in one area has an impact on other areas. It can be likened to other systems, such as the human body and ecology, where each is made up of complex interdependent relationships. An interesting real-life event in Zion National Park in the early 1930s illustrates this point. People were concerned about the disappearance of butterflies from the park. The most apparent reason for this seemed to be on account of the fact that the wildflowers had died off. On further investigation, it was found that the topsoil had been washed away from the flowerbeds. This occurred as a result of the erosion of stream banks and the consequent widening of the streams. But what caused this? The cottonwood trees, whose roots provided strength and support to the stream embankments, had become scarce. Their scarcity was traced to a multiplying deer population that was grazing on the cottonwood saplings. The deer population had increased because of the disappearance of the cougar, a mountain lion, which had fled the park when tourists first started driving through the park in their numbers (Blumberg, 2009).

Bearing these project interdependencies in mind, project managers have to be on guard against the development of scope creep. This occurs when a project's scope is modified without any authorisation or approval from the project sponsor or project steering committee. Scope creep is regarded as unmanaged change (Tasmanian Government, 2011: 27). No provision is made for adjustments to time (project schedule), cost (project budget) or resource allocation. Without a formal change-control system in place, a host of unnecessary 'nice-to-have' additions to the scope are likely to be introduced (Burke, 2018: 204). Things can become chaotic quickly and it is easy to forget about the primary intent and purpose of the project. You may be bombarded by a multitude of change requests and end up feeling overwhelmed by all the choices you are faced with implementing. This highlights the importance of having a clearly defined project scope statement in place, where there can be no question as to what work falls within and outside the bounds of the project. You will find that some change requests are not even close to being within the ballpark of the scope statement. The problem with scope creep is that the project becomes burdened with unnecessary additions that do not increase the value of the project, which pushes out its scope, together with potential cost increases, further resource consumption and the risk of completing the work late (Burke, 2018: 204).

At this point, it is worth understanding why clients and other project stakeholders request changes to the project scope. They often have good, valid reasons for doing so. Let's turn our attention to this topic in the following section.

Reasons for scope-change requests

In spite of thorough planning upfront, unanticipated circumstances and issues are likely to arise during project execution. For instance, it may become apparent that there are new requirements for the project, owing to a change in circumstances. A new technology may become available after the planning phase and the stakeholders may feel it necessary to incorporate this new technology into the project. The client may have changed their viewpoint about the product or the work approach in the time between planning and execution (Tasmanian Government, 2011: 26–27). These are the realities of the workplace, the environment and people's behaviour. These realities need to be responded to and accommodated for. Issues that arise during project execution may necessitate a change in project scope to ensure the project achieves its planned outcomes.

According to Knipe et al. (2017: 88), change requests typically result from:

- the occurrence of an event external to the company (e.g. new industry policy or legislation);
- an oversight in not making provision for a necessary product feature when the scope was defined;
- an error or omission in drafting the scope of project work; and
- the introduction of a new technology subsequent to the planning phase, which offers the opportunity for more efficient project execution, thus adding value to the project.

As the project progresses, clients often obtain new information that gives them a better understanding of what needs to be done, what the product needs to look like, or what features the product needs to offer. Errors in the course of design or building can also require scope changes to be made. New opportunities, which call for an enlargement or alteration of the project scope, can suddenly present themselves. In Burke's (2018: 200) estimation, all projects will require alterations to their scope at some time or another. These changes to the scope baseline must be underpinned by a formal change-control process. This guarantees that the baseline is kept up to date at all times (Burke, 2018: 200).

Change-control process

When clients request changes to the project, it is important that these change requests go through the appropriate channels and do not go unnoticed. A change-control process consists of clearly delineated procedures for approval and corresponding documentation. The project sponsor or project steering committee must provide signed, documented confirmation of their authorisation for the said change before it can be implemented. Additional resources may need to be allocated to the project in order to incorporate the new change. In assessing whether to approve or reject the change, the steering committee should be careful to ensure that the scope change does not prevent the realisation of project outputs and outcomes (Tasmanian Government, 2011: 25).

According to Knipe et al. (2017: 88), scope change control encompasses the following roles:

- Determining whether change requests are beneficial to the project and organisation
- Establishing whether the change request represents a change in scope
- Managing changes once authorised to ensure effective incorporation into the project

Scope change control cannot be viewed as an isolated process. It needs to be integrated with time-control, cost-control and quality-control processes (Knipe et al., 2017: 88). The scope change-control system should provide clear procedures and guidelines for approving change requests. This includes documents that need to be used and information that needs to be captured, as well as the different levels of approval required for authorising different types of change requests (Knipe et al., 2017: 88). By only accepting changes that are approved, the scope change-control process avoids the incidence of scope creep, where unnecessary features and functionality are added to the product (Burke, 2018: 197).

The scope definition is an important guideline for helping the steering committee evaluate whether the change request should be approved, rejected or deferred. When making their decision, the committee will pay close attention to the impact of the change on the operation of the project and meeting its stated objectives (Burke, 2018: 197). The administrative aspects of approving scope changes are handled by the project manager and project team.

A pivotal component of the change-control system is the change request form and the information that change requesters are required to provide on this form. If the client or other project stakeholder wishes to introduce additional design work, development work or new product features, they need to submit a formal change request to the project manager or project steering committee.

This process must be followed whenever work needs to be done that represents a change or enlargement to the scope of the initial statement of work (Stettner, 2018: 10). Change requests typically provide the following information (Stettner, 2018: 10):

- A description of the nature of the change requested
- The reason for the change in scope being put forward
- The implications of the scope change on project costs, schedule, objectives, outputs, outcomes and business benefits
- Acceptance of the change request, as evidenced by an official signature

Agile project management methodology

Some types of projects simply do not lend themselves to a clear, in-depth understanding of project scope and objectives before the work is performed. These aspects become clearer as the project progresses. This is the case with IT and computer software projects which, in many cases, have adopted an agile and adaptive approach toward their operation. In the agile approach, the project is broken down into several 'sub-projects' (or 'sprints'), which typically last 30 days. In this way, the project team explores alternative options and progressively refines the project scope.

controlling the scope baseline as it does so (Burke, 2018: 205). Scope is more or less fixed during the sprint, with new change requests often being deferred to the next or later sprints.



EXERCISE 10A

- (i) Match the following terms in Column A with their correct definitions in Column B.

Column A	Column B
a. Project scope	1. Imposes a baseline to avoid scope creep
b. Scope change	2. Features and functionality included in product
c. Product scope	3. The work needed to produce the new product
d. Scope control	4. Modification of the agreed project scope
e. Project scope statement	5. Requires that any change requests go through the formal change-control procedure

- (ii) Identify whether the following statement is true or false. Substantiate your answer.

Zion National Park could have fixed their ecological problem by bringing tens of thousands of new butterflies into the park.

- (iii) Provide your opinion on the issue of scope creep. Do you think that it could affect the achievement of a project? Substantiate your answer.

10.4 SCHEDULE MONITORING AND CONTROL

Keeping the project on track and completing it on time are core project deliverables, along with scope, cost and quality management (Burke, 2018: 220). In this section, we will discuss the purpose and importance of project schedule monitoring and control, as well as the processes used to carry out this function. We begin with a review of the context within which this activity takes place, and a brief look at some important concepts.

A key tool used for monitoring the schedule is the Gantt chart, which we discussed in Unit 4 as part of the planning phase. We learned how to create the chart (using estimated activity durations, activity dependencies and sequences) to plan the schedule and develop a basis for subsequent monitoring and control. In this section, we will look at how adding actual and forecast activity durations to the Gantt chart (during the execution phase) helps you to effectively monitor and control the project schedule. For those circumstances where your project is behind schedule, we share several options for shortening activity durations, which can help you meet the project deadline. At the same time, we point out the negative impacts of exercising these different options.

Background context

The project plan, developed during the planning phase, shows the sequenced list of activities that need to be carried out in order to produce the project deliverables and complete all the work involved in the project. This list is converted into a Gantt chart to provide an easy-to-understand visual view of all project activities and milestones. All activity durations are estimated, and these are represented by the length of the bars in the chart. Start and end dates for all activities are shown. The duration of an activity can be determined from the activity bar by calculating the number of days (or hours, weeks or whatever other time the unit is used) between the activity start date and its end date. Activities are sequenced in the order they need to be carried out, making provision for task dependencies where, for example, an activity can only start after another activity has been completed.

In some cases, two (or more) different activities can run concurrently (at the same time) if neither activity is dependent on the other, and provided there are sufficient resources; for example, a business analyst may be able to work on gathering project requirements at the same time that the solution architect is doing some preliminary IT network design investigation. Estimating an activity's duration depends on the amount of work involved in completing the task, as well as the number of resources that can be assigned to the task; for example, by assigning two business analysts to conduct stakeholder interviews, the project manager should be able to complete this work more quickly than if only one business analyst is assigned (Burke, 2018: 221–226).

Schedule monitoring and control is a component of project schedule management. According to Burke (2018: 220), project schedule management encompasses the 'techniques and processes required to complete the project on time'. Schedule monitoring and control involves tracking the project status, updating the project schedule and managing adjustments to the baseline (Burke, 2018: 221).

The purpose of schedule monitoring and control

By regularly monitoring the project schedule, the project manager can ascertain the difference between actual and planned task durations to determine whether the project is on track to achieve its ultimate deadline. Schedule control implies actions taken to ensure that project activities are carried out as per the project schedule (or project plan) so that all work is completed by the final project deadline date (European Commission, 2016: 57). Project managers need to detect any negative variances from the project plan as soon as they arise, and then decide whether corrective action should be taken (Larson and Gray, 2013: 455). Your controlling actions need to be timely – you may not be able to address a problem appropriately once it has already taken effect. In the absence of frequent monitoring and active control, it is unlikely that the project will remain in sync with the planned schedule, and this can lead to costly time overruns and frustrated clients.

The steps involved in schedule monitoring and control

Effective monitoring and control of the project schedule are best accomplished through a systematic process. The *Project Management Methodology Guide* (European Commission, 2016: 52) provides useful recommendations on the seven steps to follow to keep the project on schedule:

1. Monitor actual task durations relative to the project schedule
2. As work is carried out, update the project schedule with start dates, end dates and durations for activities performed (or in progress)
3. Review the project plan frequently to identify potential delays
4. Monitor the impact of project changes and issues on the project schedule
5. Manage project team members to ensure they stick to the baseline schedule
6. If the current project status is behind schedule, implement corrective actions to get back on track
7. Communicate project schedule changes to all affected stakeholders

Clements and Gido (2012: 153) observe that the project schedule may need to be recalculated in the event of significant lags or delays in actual schedule performance or the introduction of significant project changes. In other words, it may not be possible to achieve the planned project deadline and a new deadline may need to be negotiated with the client.

Using a tracking Gantt chart to monitor and control the project schedule

The Gantt chart is a useful tool for communicating the latest project schedule status to stakeholders. Its visual format is easy to understand, and allows senior management to see project schedule performance at a glance. During the execution phase, planned activity start dates, end dates and durations are updated with actual dates and durations, as well as revised forecasts. In this way, the original Gantt chart can be transformed into a 'tracking Gantt chart', showing the current status of scheduled tasks (Larson and Gray, 2013: 456).

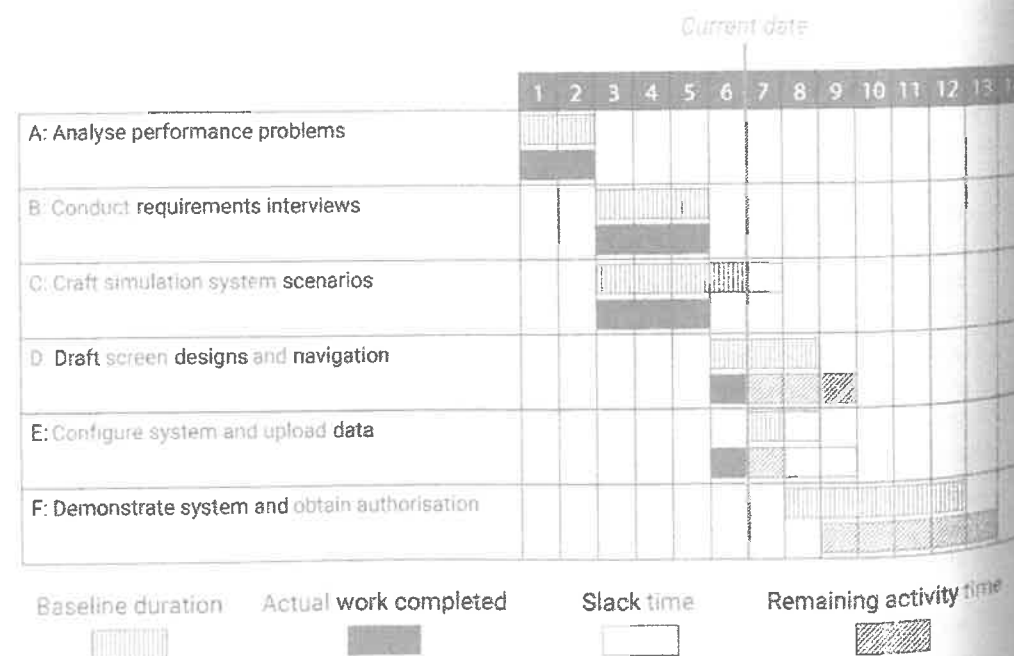
The following figure illustrates the use of a tracking Gantt chart. It has been adapted from an example used by Larson and Gray (2013: 456) to illustrate how the tool works. In this example, we make use of a simplified, hypothetical project that consists of just six activities (labelled A to F), where the duration of each activity is measured in days and the overall project is scheduled to be completed in just 13 days. The project involves the development of a training tool for call-centre employees. To avoid overcomplication, we have used single days on the horizontal axis, ignoring specific calendar dates and weekends. The chart has been produced on Day 6, as reflected by the single line on the start of this day. The bars that have a vertical line pattern represent the planned start dates, end dates and durations, as per the original Gantt chart developed during the planning stage. The solid bars beneath these represent the actual start date, end date and duration.

A quick comparison between the vertical bars and solid bars provides an immediate overview of how well the various project activities are performing relative to the planned schedule. As an example of how to interpret the tool, take a look at Activity C. When comparing the planned performance (vertical bar pattern) with the actual performance (solid bars), you can see that the task was scheduled to begin on Day 2 and run through to the end of Day 5, taking four working days to complete. In actual fact, however, the work commenced on time (as per schedule), but was completed a day earlier – at the end of Day 4. This created one day of positive slack, meaning that the resource(s) could be deployed to an alternative task to remain fully utilised and help keep the project on schedule (or ahead of schedule).

Where activities are in process (not yet completed), the remaining time estimated for completion is reflected by the diagonal bar pattern. For instance, Activity D shows that work started on schedule (Day 5) and, to date, one day's work has been performed on the activity. The diagonal bar pattern projects a further three days' work to complete the activity. If you compare this with the vertical pattern bar for Activity D, you will see that the plan has been revised – it may be that current progress or new information has been factored into this decision. As a consequence of this time extension, the start date for the final project activity (Activity F) has been postponed so that it will begin on Day 9, one day later than planned. This is because Activity F is dependent on Activity D (and E) – the simulation system cannot be demonstrated to the client until all design and configuration work has been completed. The project deadline will need to be pushed out one day, on account of the deadline, as highlighted by the diagonal pattern bar next to Activity F (Larson and Gray, 2013: 456).

Using the tracking Gantt chart can help the project manager, project team members, client and other stakeholders track schedule performance relative to plan and keep the project on target to achieve its deadline – as far as possible.

Development of a simulation training system



(Source: EDGE Learning Media (Pty) Ltd, 2020; adapted from Larson and Gray, 2013)

Figure 10.3: Tracking Gantt chart

Options for reducing activity durations

If the project is running behind schedule and there is no possibility of extending the final deadline, what can you do as a project manager to try to meet the deadline? Clements and Gido (2012: 153–157) suggest that you focus on those activities that have long estimated durations. If, for instance, a particular activity has been estimated to take ten days to complete, a 20 per cent increase in productivity on the task would allow the task to be completed in eight days, thereby saving two full days.

Contrast this with an activity that has an estimated duration of one day. A 20 per cent improvement in productivity on this task would only save one or two hours. Against this backdrop, the authors provide a number of different options for reducing the estimated duration of activities, thereby helping to achieve the overall project schedule. You should:

- assign more people to the task;
- ask the people to put in overtime work on their tasks;
- transfer underutilised people from activities that are ahead of schedule to activities that need to be fast-tracked;
- assign highly experienced people (or experts) to prioritised activities to speed up productivity;
- reduce the scope of an activity; for example, one coat of paint could be applied to a wall instead of two (if acceptable);
- eliminate one or more planned activities, where possible; for example, if a swimming pool and rockery with waterfall feature were planned for a conference venue, see whether it is possible to eliminate the rockery and waterfall to save time;
- apply technology to increase productivity; for example, it may be possible to employ technology to automatically capture certain data instead of having a project team member capture the information manually.

Clements and Gido (2012) state that we should *not* assume that by adding people to a task, productivity will automatically improve. You are probably well aware of the saying 'too many cooks spoil the broth', and the same principle applies here. Adding resources may cause people to step on each other's toes, it may create distractions, and it could result in experienced workers losing valuable time when helping to get new resources up to speed with tasks.

In the next section, we turn to the dangers of shortening a carefully planned and agreed-upon project schedule. The project client or sponsor might approach the project manager and state that the deadline needs to be moved forward, without being able to appreciate the impact that this requirement will have on various project performance dimensions.

The impact of reducing the project duration

Reducing the project duration can negatively impact several important performance parameters. Project managers need to point out these implications to the client and negotiate accordingly. Where the project manager has no space to manoeuvre, they will have to closely manage the

impact of the reduced duration on these other areas. Burke (2018: 230) observes that a shortened project schedule will have the following impacts:

- Scope (what the project aims to achieve) may need to be reduced in view of less time being available to complete the necessary project work.
- Critical path activities will need to be fast-tracked or 'crashed' to facilitate the achievement of the new project deadline.
- Labour costs will likely increase.
- Quality may be negatively impacted by the time pressure, as well as by the reduced opportunity to perform quality-control activities.
- Delivery costs may increase in cases where suppliers are asked to speed up delivery of goods, perhaps making use of expensive air freight (rather than road haulage or sea freight).
- Project team members may be required to work overtime, leading to fatigue (possibly falling asleep at work or increasing the risk of workplace accidents), lower quality, lagging morale, and higher labour costs.

The previous points also apply to a project that has fallen behind schedule and still needs to be completed by the planned deadline date. Critical project objectives, such as scope, quality and budget, can be compromised by a failure to adequately control the schedule (Clements and Gido, 2012: 156). If the schedule cannot be extended, the client, contractor, project manager or team may need to acknowledge that one or more of these objectives may no longer be feasible. By managing schedule problems as soon as they arise, a project manager will be able to minimise the potential negative impact on cost, quality or scope (Clements and Gido, 2012: 157).

10.5 RESOURCE MONITORING AND CONTROL

One of the core activities carried out in resource planning is to determine how many resources would be needed to perform the full scope of work in order to complete the project on schedule. During the execution phase, there may be several occasions when the workload and availability of resources do not match. In other words, the demand for labour and the supply of labour are not equal. These situations call for the project manager to try to balance the two, a practice more formally known as resource levelling, which we will discuss in this section. In levelling resources, we make sure they are neither overloaded nor underloaded; they should be fully utilised and ready to cope with the workload and meet the project schedule demands.

We will examine ways and means by which the project's resources can either be decreased or increased. During project execution, the project manager also needs to evaluate the effectiveness of the team (and individual team members) with a view to ensuring that each person makes a valuable contribution to the project. Dysfunctional behaviours that threaten to disrupt the project should also be addressed. The final aspect we will touch on involves the tools the project manager can use to facilitate resource monitoring and control; specifically resource calendars and 'managing teams' and 'controlling resources'.

Knipe et al. (2017: 259) define resources as 'all means or efforts that go into producing the outcome of a project'. People are required to perform project work (activities), and these people will have specific skill sets. They may be architects, builders, engineers or programmers, among others. These people often need to accomplish their tasks through the use of different kinds of equipment, such as cranes, forklifts, diggers, wheelbarrows, ladders, drills, computers and servers. The items we have just listed are referred to as *non-consumable* resources. They are not consumed during the process of work. Instead, they can be used again and again on subsequent work and projects.

In addition, the project will likely also need to make use of *consumable* resources, such as bricks, concrete, bolts, nuts, paint, paper and money. Once these resources have been used, they cannot be used again (Knipe et al., 2017: 259–261). Resources therefore include people, equipment and raw materials. In this section, we will focus our attention on people, the most valuable organisational 'asset', and one that requires the greatest attention in terms of monitoring and control.

In the process of managing a team, a project manager must track the performance of individual team members, provide them with useful feedback so that they can optimise their performance, and assist them in resolving issues that may be limiting their ability to work effectively. The term 'controlling resources' can be defined as 'the process of ensuring that the physical resources assigned and allocated to the project are available as planned, as well as monitoring the planned versus actual use of resources and performing corrective actions as necessary' (Burke, 2018: 277).

The project manager must therefore keep the project on plan in terms of resource allocation – if workers have been assigned to a particular task on a particular date, the project manager must see to it that this happens in order to keep the project on schedule to meet its objectives. Where the necessary human resources are not available to do planned work, the project manager must step in and devise a plan to make other resources available or schedule the work for a later date.

Resource levelling

A mismatch between the number of resources required and the number of resources available means that there are either too few or too many resources for the work that needs to be performed. A *resource overload* refers to a situation where there are not enough resources to perform the work, whereas a *resource underload* refers to a situation where resources are idle because there is insufficient work to do (Burke, 2018: 280). The project manager needs to either move the activity to another time/date or adjust the number of resources to meet the activity's demands. This process is known as resource levelling.

Resource-overload situations are addressed by increasing the number of resources (or extending the project deadline date), while resource-underload situations are addressed by reducing the number of resources that are assigned to the project. However, a project might stipulate a fixed number of resources, in which case an overload situation cannot be addressed by increasing resources – the only option is to move out the project end date. Sometimes, the end date of the

project is fixed, meaning the project manager must increase the number of resources to meet the deadline. When a project is behind schedule, it is usually best to assign people to tasks on the critical path first, as any delays to a critical task will delay the entire project (Burke, 2018: 280).

If the project manager is facing a resource-overload situation (where the resources are overloaded with work), how can they increase the project's resources? The following options could be explored (Burke, 2018: 284):

- *Get project team members to work overtime:* Be aware of the higher labour rate payable for overtime work, as well as the possibility of reduced productivity as a result of physical and mental fatigue.
- *Employ subcontractors to bolster the current workforce:* Higher rates will probably need to be paid and there could be issues in terms of quality and the time needed to get up to speed. Greater supervision will be required.
- *Negotiate a reduction in project scope with the sponsor:* If it is not possible to implement either of the previous options, and the deadline is fixed, the project manager may need to negotiate with the sponsor to reduce the scope of work. In doing so, the project manager needs to try to avoid an outcome where the project is unable to deliver its core deliverables and projected business benefits are not realised.

If resources are underutilised (resource underload), it means they are idle. This is not good either. People have been employed in the first place to utilise their skills and energies to make a valuable contribution to the project and company. They are paid to be productive and help the company achieve its goals.

In many projects, however, resources can undergo slack (or float) periods, where their work demands fall. For instance, a business analyst may be kept busy during the initiation and planning phases of a software development project, but may have very little to do during the execution phase (when the developers are busy with coding). If this is the case, the project manager has a few options to address resource underload (Burke, 2018: 285):

- Move the underworked resources to other areas of the project, where there is a lot of work. Consider, in particular, utilising the resources on critical path activities.
- Send the resources to the functional department in which they are employed for ongoing non-project work; for example, operations, IT or marketing.
- Encourage the person to take holiday leave and return when work demands pick up.
- Send the person on training to learn new skills, which they can use in their ongoing work or project capacity.
- Deploy the person to the research and development area, where they can make a contribution to the development of new products and services (or new processes) for the market.

Providing feedback on performance

Organisations expect their staff to be productive, professional, take responsibility, to fully use their skills and to demonstrate their commitment to the company. However, our work experience

shows us that people do not act professionally and responsibly at all times. They may even cause the project to suffer as a result of their behaviour or actions. The project manager is there to lead the team, help them realise their true potential, and ensure they are working effectively so that the project's goals of scope, quality, schedule and cost can be achieved. Knipe et al. (2017: 207) recommend that the project manager conduct regular team effectiveness reviews to discuss performance and improve individual and team effectiveness.

The project manager should assess how the team member is progressing. They should ask the team member questions about their goals, to provide a personal assessment of their own performance, and solutions they have in mind to improve performance. By doing so, the worker can be assisted in coming up with creative solutions to problems and this can lead to higher levels of commitment. Not only should individual performance be addressed, but so should the functioning of the team as a whole. The project manager can provide feedback on team functioning within meetings, for instance. The idea is to ensure that the team is working as a coordinated unit in a spirit of collaboration. Where issues and conflicts are apparent, these should be dealt with so that team productivity and performance do not spiral downward.

In cases where team members are not completing their work on time, arriving at work late, or failing to attend meetings, the project manager needs to confront them and see to it that such behaviours do not persist.

Tools for facilitating resource monitoring and control

A project manager has a host of different responsibilities, and it can be difficult to keep on top of all the things that need to be done. This is where some simple technological tools can assist in combatting forgetfulness and helping to track and manage project resources. For instance, a memory aid is required to keep track of when each individual is available to perform project work. A resource calendar – for each team member – can be used for this purpose. It will show when the person is on leave, out of the office for an appointment, working on another project, working on their normal daily job (non-project work), and the hours, days and weeks in which the person is available to perform project work (Knipe et al., 2017: 267).

If the person has been allocated too much work (e.g. 50 hours' work in a 40-hour work week), the tool will notify you of the situation so that you can make appropriate adjustments. Another useful tool for project managers to use is a diary. They can use a diary to follow up with team members on the date a project deliverable falls due. For instance, if the project schedule shows that Nomfundo Buthelezi is due to submit her business requirements specification on Tuesday, then the project manager should have a reminder to follow up with her at close of business on Tuesday, or on Wednesday morning.

Remember that it is the project manager's responsibility to ensure that team members complete their tasks properly and on time. These simple tools help the project manager to be well organised and overcome lapses in memory.



EXERCISE 10B

- (i) In your own words, explain what is meant by an imbalance between the demand and supply of labour.
- (ii) Provide an example of how a project manager could control resources.
- (iii) Substantiate the following statement.

The project manager needs to confront a team member who fails to pitch up to weekly meetings on time.

10.6 FINANCIAL MONITORING AND CONTROL

The financial plan and budget are usually developed during the initiation stage of the project, and refined during the planning stage. Budgeting involves calculating how much money will be needed to perform the project work, and how it should be allocated over the course of the project (Lumen Learning 2, n.d.). The budget serves as a baseline for monitoring and controlling expenditure during project execution (Barron and Barron, 2019). It is the standard against which cost performance is measured. A budget is prepared after receiving cost estimates for personnel, equipment and material costs from the project manager (Barron and Barron, 2019). The project sponsor reviews these estimates and typically negotiates the fees to try to secure the best deal before authorising and allocating an agreed budget to the project.

The importance of cost control

When funds are limited and spending on a project is out of control, project sponsors cannot continually provide money for the project. As a project manager, it is your job to prevent the unnecessary spending of funds on non-essential expenses. Once the budget is agreed, the project manager needs to manage costs to ensure that expenditure does not exceed budget. This requires continual monitoring against the budget (cost baseline). Financial records need to be updated as costs are incurred, and any changes to the cost baseline must be closely managed. Failure to keep the project within the bounds of the budget can result in a project running out of funds before the work is completed (Lumen Learning 2, n.d.) – a situation where you have more work left to perform than you have funds to pay for it.

You may have witnessed residential buildings or other construction projects that ran out of money during the building process, bringing any further development to a halt and leading to large losses for investors. As a project manager, your performance is partly assessed by your ability to adhere to the budget. Recall the triple constraint that project managers face: scope, schedule and cost. A smart project manager recognises the importance of money and thinks like a business owner in terms of carefully using those funds to deliver an efficient and effective project. They do not spend money unnecessarily.

The *Project Management Methodology Guide* (European Commission, 2016: 58) states that the purpose of cost control is to keep costs within the overall project budget and 'in line with the cost/effort baseline'. If the project is at risk of not meeting the budget constraint, the project manager needs to advise the project steering committee and remedial actions need to be considered and agreed upon for getting the project back on track. If significant cost overruns are anticipated, the project manager will need to justify these to the project owner, with a view to augmenting the budget (European Commission, 2016: 58).

In the next section, we look at the mechanics of cost control through the use of a cost-control sheet and variance analysis.

Variance analysis and cost-control sheets

In order to exercise effective cost control, you need to compare actual costs incurred with budgeted amounts. The difference is referred to as the variance (Lumen Learning 2, n.d.). By doing these comparisons, you can quickly determine whether or not you are adhering to the budgeting plan. The budgeting plan should show how much money can be spent in each period over the course of the project. If the overall budget for a five-month project is R 10 million, the plan might be for no more than R 5 million of this amount to be used by the end of the second month. Consequently, if R 5 million has already been spent after just one and a half months, this represents a deviation from the plan and a problem with cost control. Portraying actual expenditure against planned expenditure in a graph will quickly highlight cost overruns and point out the need for action to be taken to rectify the variance (Knipe et al., 2017: 284). The graph can be derived from a cost-control sheet, where budgeted and actual costs are captured, and variances automatically calculated. The following table provides an example of a cost-control sheet for a small part of a hypothetical project. For illustrative purposes, we have shown a sample of three work packages. The variance is calculated by subtracting the actual cost from the budget:

$$\text{Variance} = \text{Budget} - \text{Actual cost}$$

Zero (0) variance means that the work strictly adhered to the budgeted amount (e.g. document analysis). A positive variance means that the work was completed under budget (e.g. requirements interviews). A negative variance means that the cost of completing the work exceeded the budget amount (e.g. requirements specification). To determine the variance percentage, you need to divide the variance amount by the budget and multiply the result by 100:

$$\text{Variance percentage} = (\text{Variance}/\text{Budget}) \times 100$$

Work package	Budget	Actual cost	Variance	Per cent variance
Document analysis	R 1 000	R 1 000	R 0	0%
Requirements interviews	R 4 000	R 3 600	R 400	10%
Requirements specifications	R 5 000	R 6 000	(R 1 000)	-20%
Totals	R 10 000	R 10 600	(R 600)	-6%

(Source: EDGE Learning Media (Pty) Ltd, 2020)

Table 10.1: Cost-control sheet

In the previous table, you can see that the project is currently exceeding its budget by an amount of R 600. To ensure the financial success of the project, the project manager needs to address these cost overruns and control them. Measures need to be implemented to reduce costs in other areas to bring the project back on track.

Tips for effective cost control

We have discussed the importance of adhering to the budget, as well as the use of a cost-control sheet to monitor actual expenditure against budget. Now let's examine some practical measures you can take to control expenditure so that your project is financially successful and does not suffer from cash-flow problems.

Clements and Gido (2012: 242) state that it is crucial to monitor cost performance frequently so that any variances are picked up quickly, and so that corrective actions can be implemented before expenditure gets out of control. If cost overruns are detected too late or corrective measures are put into place too late, it becomes very difficult to achieve budget. We need to consider which items a project manager should select for cost control, as not every element will have an equal effect on the budget. Clements and Gido (2012: 242) suggest that you focus on those activities that represent larger cost elements. For instance, you will achieve greater savings by applying cost-control measures to a work package that has a budget of R 10 000 than to a work package that has a budget of R 2 000. A saving of ten per cent on the R 10 000 activity will reduce expenditure by R 1 000, as compared to the R 200 saved on the activity budgeted at R 2 000.

There are various options available for reducing costs, including the following (Clements and Gido, 2012: 242):

- Negotiate with an alternative supplier that can provide raw materials at a lower price.
- Replace a project team member with a more skilled or experienced worker who can perform the work more productively (i.e. in less time).
- Automate project work, where feasible, if technology can be used to perform work more cheaply than the manual method.
- Negotiate with the project sponsor to reduce the scope of a large activity; for example, you may be able to agree on postponing a particular 'nice-to-have' software feature until a later product version is released. Not all things are absolutely necessary.

10.7 QUALITY MONITORING AND CONTROL

Many project managers tend to focus on budget and schedule when monitoring and controlling a project, sometimes to the exclusion of quality. It is all well completing a software project on time and within budget, but if the system is filled with bugs, this will not help the customer much at all (University of Wisconsin, n.d.). Imagine that you have just graduated from flight school and, when you are about to pilot your first commercial flight, the airline tells you that the aircraft was made by the lowest bidder. How confident would you feel about your safety?

A quality product is one that is made to the required condition or standard, as outlined in the project charter (Burke, 2018: 371). The product must meet the requirements laid down by the customer. Sometimes when project practitioners speak about quality, they are referring to something more than the traditional meaning given to quality. Burke (2018: 374) explains that quality is part of meeting the project objectives: completing the full scope of work on time, within the provided budget, and to the required condition.

The purpose of quality control within the overall quality management plan

Quality monitoring and control are part of quality management. We discussed this concept in earlier units. The *Project Management Methodology Guide* (European Commission, 2016: 66) speaks about the efficiency and effectiveness aspects of quality management. From an efficiency perspective, the project should be carried out productively with no more resources than are needed.

From an effectiveness point of view, the project deliverables should be accepted by the project sponsor or customer as meeting their expectations. The quality management plan should contain a detailed outline of (European Commission, 2016: 66):

- the quality objectives;
- customer requirements;
- the planned approach to ensuring quality (including quality-related activities);
- metrics for monitoring and assessing quality;
- different people's responsibilities with respect to quality management; and
- the steps for performing the various quality management processes.

Ultimately, quality management is aimed at ensuring that the project fulfils the needs it was designed to fulfil in the first place (Knipe et al., 2017: 238). Quality management addresses both the product (or deliverables) that the project is set up to produce, and the project processes that are responsible for producing the product (Knipe et al., 2017: 238). If the processes are carried out in line with requirements, then the outputs and outcomes should be assured, and those outputs must meet customer requirements – in other words, they need to be fit for purpose (Tasmanian Government, 2011: 119). The quality plan alone is not sufficient to ensure that a product meets the required condition. Rigorous quality monitoring and control activities are required to bring the plan to fruition.

Quality assurance and control activities prevent substandard deliverables from being handed over to the customer (Burke, 2018: 377). Through the use of clearly specified quality criteria, we can reduce the risk of the project outputs being unfit for purpose. There is therefore less chance of the customer rejecting the deliverables or insisting on having them reworked. Having sound quality-control processes in place also helps the project to meet time and cost objectives (Tasmanian Government, 2011: 120).

To ascertain whether project outputs are fit for purpose, acceptance criteria are applied to each deliverable when quality checks are performed (Barron and Barron, 2019: 41). If the criteria are

met, then the project outputs meet the customer's needs. This will help them to achieve the required business outcomes. For instance, a new home-loan application system (project product/output) will be used to help improve processing speed and accuracy, with a view to increasing the number of home-loan clients (business outcomes). Both quality-assurance and quality-control processes need to be in place in order to benefit from fit-for-purpose products. We will elaborate on these processes in the next section.

Quality assurance vs quality control

Quality assurance relates to the activities and processes used to produce the product. Quality-control activities are concerned with measuring the project outputs (products) in terms of certain quality criteria (Tasmanian Government, 2011: 119). According to Burke (2018: 371), quality assurance provides project stakeholders with confidence that the project will produce outputs to the required standard and will achieve time and cost objectives. In other words, it gives sponsors and customers a sense of assurance that the appropriate quality management processes are in place to ensure that the project meets its designed outcomes.

Stakeholders should have a measure of confidence that the proper management processes and controls are in place, so as to deliver a product in the required quality or condition. Quality-assurance activities involve regular checks to confirm that the planned quality activities outlined in the quality management plan are, in fact, being carried out to the necessary standard. If the plan is not being carried out, then corrective measures need to be taken to ensure that the relevant project team members do what they need to do. Overall project performance should also be frequently monitored to ensure that the project is on track to meet its time, cost and quality objectives.

While quality-assurance activities focus on processes, quality control is concerned with measuring inspecting and testing project outputs to confirm whether they meet the required quality standards and are fit for purpose (Burke, 2018: 377). Simply put, can the product do what it is meant to do? Does it meet the customer's requirements? If not, the customer would not be able to use the product as intended and, as a result, would not be in a position to reap the intended business benefits. When performing quality control, the product should be compared against the specifications laid down in the contract.

Quality audits should be carried out to verify that the product conforms to specifications. Where there are areas of non-conformance, these findings should be documented, and corrective measures should be recommended. When project team members know that their work outputs will be evaluated and assessed through an internal audit, they will be more motivated to give greater focus to the quality of their work (Lumen Learning 2, n.d.).

Cultivating a quality ethos

In today's fast economy, where there is intense competition, there is an increasing demand for high levels of productivity. We are also swamped with masses of information that can be difficult to make sense of or analyse in a meaningful way. In technical speak, we have progressed from megabytes to gigabytes, terabytes, petabytes and even exabytes. Unfortunately, when excessive

emphasis is placed on quantity, quality is often overlooked and quickly falls to the wayside. In leading their teams, project managers ought to try to create a culture of quality whereby team members take pride in their quality of work.

Pride in one's craft begins with an attitude that respects and values the customer. Being motivated to deliver a product of exceptional quality helps the project team meet their objectives. Quality work involves a deep-seated belief in excellence, value and contributing to a better world. It is other-centred, rather than self-centred – focused on giving rather than taking. It believes in doing the right thing, exerting one's full energies on worthy causes, and using one's talents to their full potential. Quality work (and quality outputs) really ought to be at the top of everyone's agenda. There can be no excuse for poor-quality work or mediocrity. In our time-pressured work environments, many will be tempted to overlook quality and simply focus on meeting their productivity targets. However, such a limited focus will lead to failed project outcomes.



EXERCISE 10C

- (i) Provide an example to distinguish between 'efficiency' and 'effectiveness'.
- (ii) Analyse the relationship between quality assurance and the need to perform work again (rework).
- (iii) Do you think that work environments should replace productivity targets with quality targets? Substantiate your answer.

EXAMPLE 10 A

In March 2001, a massive oil production platform belonging to Petrobras – the Brazilian-owned oil and gas company – sunk approximately 130 km off the coast of Brazil. Inadequate safety measures and inspection procedures were responsible for two big explosions that caused the platform to become destabilised, and ultimately sink. A total of 11 people on board were killed in the incident and the cost of the incident was estimated at over \$ 500 million (over R 7 billion). Apart from lax quality-assurance measures, the incident was also attributed to pressure being applied by management to increase output.

Ironically, an unnamed Petrobras executive bragged about the benefits the company enjoyed as a result of reducing costs spent on quality assurance and inspections. The executive said: 'Petrobras has established new global benchmarks for the generation of exceptional shareholder wealth through an aggressive and innovative program of cost cutting on its P36 [the name of the oil platform] production facility' (Watt, 2014). This was a painful lesson about financial greed and the consequences of overlooking quality in the drive to maximise production and cut costs.

(Source: EDGE Learning Media (Pty) Ltd, 2020; adapted from Watt, 2014)



(Source: Watt, 2014)

Figure 10.4: Sinking of the Petrobras oil rig

10.8 RISK MONITORING AND CONTROL

Your project might go off without a hitch, but you should never assume that this is going to be the case. In reality, things can go wrong, quickly dampening your initial enthusiasm. These are inevitable risks that every project faces, but a project manager cannot simply ignore them and hope they do not occur. You have to be proactive and deal with these risks, or they may take you by surprise.

All projects face various risks that threaten to prevent the achievement of the project's objectives. Risks may be of a technical nature, such as the risk that a system in development will not work. Risks can also be of a non-technical nature, such as risks related to meeting the project schedule, or the risk of not being able to access the necessary funding for the project. If the project deadline is at risk of not being met, it may be necessary to speed up the project by reducing the duration of activities that fall along the critical path. A funding risk can arise when finances are under pressure through limited cash flow or imposed dates of financing, and the project sponsor may even suddenly cut the project budget. Alternatively, initial project plans may turn out to involve significantly more work or expenditure than expected. In this case, the result is that it becomes almost impossible to complete the project within budget. Sometimes, a new chief executive officer (CEO) can be appointed shortly after a project has begun, and that CEO may decide to

cancel the current project and replace it with another that they favour (Larson and Gray, 2013: 224–226). These are just some of the many risks that projects are exposed to.

In units 6 and 9, we looked at risk management, particularly the identification and assessment of risks and development of a risk management plan. In this section, we address the monitoring and control of risks during the execution phase of the project. We will discuss the four risk-response options that are available to project managers; the development of contingency plans to put in place in the event of foreseen risks materialising; the updating of a risk register as risk profiles change during the course of project execution; and the maintenance of the risk plan during the course of the project.

10.8.1 The four responses

The risk-response plan attempts to prevent certain risks from happening altogether, or to reduce their likelihood or impact. Alternatively, it provides a plan of action that will address the risk in the event that it does materialise. Included in the risk-response plan are the development of trigger points for the activation of planned risk responses and the assignment of responsibilities to different people for the monitoring, treatment and ownership of risks (Clements and Gido, 2012: 273). This means that particular circumstances would indicate that a response needs to be implemented. For example, waterproof covering would need to be provided for an outdoor event in case of rain, and the circumstances that trigger this response would be if the weather forecast changes from sunny to overcast.

There are four general ways to respond to risk: mitigation, avoidance, transfer and acceptance. The specific actions involved in each of these strategies should be outlined in the planning stage, in order to ensure proactive risk management and to increase the likelihood of project success. The four risk responses are now briefly discussed.

Risk mitigation

This refers to actions taken to reduce the probability that a risk will occur, or to lessen the impact that a risk will have in the event that it does occur. The risk of a new system malfunctioning can be reduced by conducting load tests, performance tests, or scalability tests. Similarly, the risk of users rejecting the system can be reduced by performing usability testing before rolling it out. Another option to gain user buy-in is to develop several prototypes of the system to gain user feedback before finalising system navigation, functionality or the look and feel. Offering users training on the system can also go a long way to ensuring system use upon release. If, despite one's best measures to reduce the likelihood of a risk transpiring, the risk still materialises, then you may still be able to mitigate (lessen) the risk in terms of its impact by making provision for this outcome beforehand (Larson and Gray, 2013: 219–220).

For example, if your project involved the development of a website, you could create a second website in parallel with the primary one, in case the first website fails to receive uptake from users (Clements and Gido, 2012: 274). The second website may have fewer features, have simpler navigation or may possess a similar look and feel to another system that the users have been

working with. If the main system under development failed to deliver the goods, you could switch over to the alternative product, hopefully leading to greater user acceptance and, thus, lessening the adverse impact.

Risk avoidance

This strategy aims to remove a particular risk, which may be possible in certain circumstances. For example, instead of using the latest development tool for a software project, you could rather go with a tried-and-tested programming language to eliminate uncertainties. In this way, the risk of technical failure can be avoided. If your project is reliant on supplies from a foreign country that is in the midst of political turmoil, you might be able to avoid the risk of delays (or other obstructions) by contracting with a supplier in a more politically stable country.

Risk transfer

If you do not have the capability to handle a particular risk, you may be able to pass the risk to another party. This will usually come in the form of insurance, and will require the payment of a premium. It is possible that an insurer may be willing to take on the risk. Alternatively, if you are concerned about a contractor failing to complete the assigned work using the amount you have budgeted for, you might decide to negotiate a fixed-price contract with the supplier on a condition in the contract that would hold them accountable for late or faulty deliveries. This places the risk of extra cost on the supplier, who would then have to monitor and control its costs and work wisely to ensure that it makes its required profit margin. If your project involves the purchase of an off-the-shelf application from a software provider, you could transfer the risk of the solution malfunctioning by obtaining a warranty from the supplier (Larson and Gray, 2013: 221–222).

Risk acceptance

Unlike mitigation and avoidance tactics, which put measures in place to avoid the risk or reduce its impact (or likelihood), this strategy is only taken once a risk actually occurs (Clements and Gido, 2012: 274). It accepts the fact that the risk may occur, but aims to only deal with it at that stage. Take, for example, the risk of a tsunami washing away your beachfront office. There is not much you can do to avoid this risk (apart from moving your office to another location) or reduce its impact if it transpires. However, you are comfortable with this risk because you regard its possibility as being so remote that you are willing to accept it. There may also be other risks that you feel you have sufficient budget to cope with if they materialise. Where you do decide to accept a risk, it is important to put a contingency plan in place, detailing the actions that you will take to deal with the risk when it does occur (Larson and Gray, 2013: 222).

10.8.2 Contingency plans

Risk-response plans should be put into action before a risk event comes into play. Contingency plans, on the other hand, refer to actions taken after a risk becomes reality. A contingency plan triggers a course of action when the risk becomes a reality. These actions are aimed at lessening

the impact of the risk event. You may wonder why project managers do not always decide on a plan of action once they are actually faced with the risk event itself. Putting a plan in place before the occurrence of the risk event helps you to think through appropriate responses beforehand, and respond in an organised and efficient manner, rather than being overwhelmed by the stress of the occasion (Larson and Gray, 2013: 223). It can also allow you to prepare for risk events that may otherwise end the project if not handled appropriately.

Let's take a look at some examples of contingency plans in practice. If a newly rolled-out software solution ends up with interface issues and unhappy users, you could create a contingency plan that requires staff from the information systems department to walk the floors and be on hand to deal with issues as they arise. If the new system freezes, as a result slowing down users who depend on a fast system to help clients in real time, you could reinstall the software, hopefully fixing the problem. If the equipment you have received from a supplier turns out to be unreliable, you could quickly place an order with a previously identified alternative supplier (Larson and Gray, 2013: 223).

How do you decide when your contingency plan needs to be activated? You need to establish a trigger point or a threshold beforehand; for example, if the system is freezing intermittently, you may decide that the appropriate time to activate your contingency is when this condition has existed for one hour. If your project falls behind schedule by more than three per cent, you could implement your contingency plan and start with overtime work (Clements and Gido, 2012: 274).

10.8.3 The risk register

The risk register contains a list of risks, showing next to each risk its probability of occurrence, impact, planned response actions, contingency plans, risk owner and the current status of the risk (Larson and Gray, 2013: 229). The document is used for risk-control purposes and should be updated throughout the course of the project, as and when needed. If new information arises (after the risk-planning phase), which suggests a change in the nature of the risk, then it is necessary to update the risk information accordingly. For example, if the new information suggests that the probability of a particular risk has reduced or its potential impact is lower than initially believed, then you should enter this information on the risk register.

In the course of implementing your risk-response plans, you should monitor their effectiveness and enter this information on the register – so that the information can be recorded and used for learning purposes. If the status of a risk changes and begins to represent a greater danger to the success of the project, then this information should be entered on the risk register. From these examples, it should be clear that the risk register is not 'set in stone'; it is a living document that needs to be continually updated as the risk profile of the project changes over time. The project core team also needs to be on the lookout for new risks that were not previously foreseen. They should inform the project manager of such risks and add them to the risk register.

10.8.4 Maintaining the plan

The project plan itself can be affected by different risk developments, with the result that it needs to be updated on occasion. The risk of changes to project scope, budgets and project timelines

call for the use of a formalised change management system to manage such events (Larson and Gray, 2013: 229). Implementing a contingency plan in the wake of a risk event will have an impact on project costs and schedule. Additional resources may need to be purchased or contracted. Alternatively, further funds may be needed for overtime work. These funds should come from a contingency reserve that was set aside for this purpose. The project plan should be updated accordingly with the additional expenditure.

Regular risk reviews should be conducted during the execution of the project so that you are in a position to manage risk appropriately and enhance the likelihood of project success. The project team may deem that a particular risk now warrants a greater priority than its original rating. Where the project customer makes changes to the scope, schedule or budget, risk assessment profiles will need to be updated. Such changes may bring new risks into play, and these should be recorded. An important aspect to monitor during risk reviews is the trigger points for different identified risks. If conditions point to a risk trigger point on the cusp of being realised, then swift action needs to be taken to put contingency measures in place.

As the project progresses, you will be in a position to determine which risks did or did not materialise and, with the benefit of hindsight, you will be able to compare these with your risk management plan and initial risk assessment. In recording this information on a risk report, you will possess insightful information that can provide useful lessons for future projects.



EXERCISE 10D

- (i) In your own words, explain how the use of a fixed-price contract with a supplier can help you control costs.
- (ii) Provide an example of a situation where you would adopt a contingency plan, instead of a risk avoidance or mitigation plan.
- (iii) Discuss why trigger points should be used with contingency plans.

10.9 COMMUNICATION MONITORING AND CONTROL

Communicating well is a key part of making sure that you know what is going on in the project. Your stakeholders and project team need to know about many things they cannot be expected to find out for themselves. As a project manager, you should be aware of the flow of information throughout the project, and make sure that it is reaching the right people. You should communicate with all employees directly. Project managers are responsible for collating project information, tailoring it to particular stakeholder needs, and distributing this filtered information to these stakeholders. They can use this information to facilitate their own decisions and actions and it ensures they are kept up to date.

Stakeholders, together with their information needs, are identified in the planning phase. On this basis, a communication plan is developed, detailing what information needs to be conveyed to these stakeholders (Barron and Barron, 2019: 40). This communication plan serves as a basis for checking that communication during the execution phase is in line with what was planned. Project communications should be evaluated for their effectiveness as the project progresses. It may turn out that the initial stakeholder analysis is no longer valid and there are now several new stakeholders involved with the project, or it may be that the key messages originally formulated for different stakeholders are no longer effective and require refinement. Regular monitoring will enable the project manager to assess whether the planned communication outcomes are being achieved; if not, a new approach needs to be developed (Tasmanian Government, 2011).

Updates provided to project stakeholders will often be in the form of updates to the project plans. It is inevitable that as the project progresses, things will not go strictly according to plan. Stakeholders need to be aware of these deviations so that they can make informed decisions and take appropriate actions to get back on track. In order for the project manager to help the core team (a key stakeholder) achieve their milestones on budget, on time, within scope and at the appropriate level of quality, it is vital that they distribute relevant monitoring information in a timely manner (Stettner, 2018).

According to Stettner (2018), changes to project plans need to be carefully managed, and costs and project schedules must be closely monitored. Status reports are an important tool for keeping projects on track. The gap between the plan and the reality (that occurs during the execution phase) needs to be minimised so that the project aims can be achieved. Providing relevant monitoring and controlling information to project stakeholders puts them in a position to respond appropriately to current and potential problems. Without the right information, well-informed decisions cannot be made, and it will be exceptionally difficult to keep the project on track (University of Wisconsin, n.d.).

A major element of project communication concerns the distribution of reports. In the following section, we will discuss some of the key principles of project reporting, and focus on status reports and their role in facilitating project progress.

10.9.1 Project reporting

In a world in which most people are contending with an overload of information, project managers need to keep the following principles in mind for effective reporting (University of Wisconsin, n.d.):

- *Dumping masses of data on project stakeholders should be avoided:* Information needs to be filtered and slimmed down in order to provide only essential details to the recipient. It takes valuable time to read masses of useless data and does not assist project stakeholders with their decision-making.
- *Information needs to be organised to facilitate decision-making:* There is a difference between data and information. Data needs to be analysed, processed and organised in order for it to make sense and inform decisions. Raw data must be converted into information if it is going to aid understanding and be used to inform decisions.

- *Reports should be tailored toward individual stakeholder needs:* Instead of providing clients, senior managers, vendors and project team members with the same information, the project manager needs to make sure that each stakeholder is only given the information they need to know. Senior managers, for instance, do not have the time or inclination to inspect every small detail of project work. They need to get a bird's-eye view of the project, including critical project performance indicators (e.g. schedule status and forecast costs) and problems that threaten to adversely affect project success. Software developers, on the other hand, would need to be updated on the status of low-level details, such as coding issues and individual tasks on the project plan.
- *Regular information updates should be provided:* Information often has an attached value that depends on how quickly it is spread to the appropriate parties. The more regularly and consistently you share relevant project information, the more valuable the communication will be. If you send an update late, the chances are that the information will no longer be valuable to the team, as they may have already completed the work that would be affected by the update.
- *Information should be up to date:* If stakeholders receive outdated information, they could make the wrong decisions, with potentially serious consequences. Online electronic dashboards that are regularly updated with current information can greatly assist in this regard.
- *Information should be gathered, collated and processed in a cost-effective manner:* It does not make economic sense to spend copious amounts of time and money compiling information if the financial benefits of the information cannot be justified.
- *Put recipients in a position to respond and act, as appropriate:* The purpose of distributing monitoring information is to give the receiver the time and resources needed to act on the information. These actions may be in the form of making slight adjustments to their tasks or could involve major changes, such as altering the project schedule, budget allocation or scope of work.

Status reports

Status reports are used by project managers to communicate project progress (against the project plan) to the project sponsor or the project steering committee. The sponsor or steering committee should occupy a central position and priority focus in the project manager's mind, as they provide the funds and have the authority to terminate the project at any time if it does not deliver in line with expectations. They will expect to receive regular reports on project progress relative to planning so that they can make appropriate decisions on a timely basis (Tasmanian Government, 2011). They will also need to know about project obstacles that could require taking action in order to overcome them.

According to Stettner (2018), status reports should not simply be distributed electronically to stakeholders but should also form the basis and agenda for regular meetings between the project manager and the client. Face-to-face meetings are important for building client relationships, engendering trust and demonstrating transparency. The project manager should walk the client through the status report, making every attempt to ensure the client obtains a full grasp of its content (Stettner, 2018). Now that we can appreciate how important status reports are, we need to consider what specific information these reports should include. Some content recommendations include the following (Tasmanian Government, 2011):

- A high-level indication of progress against the project plan and its key milestones
- An overview of how effective risk mitigation plans have been in overcoming risks highlighted in the risk management plan, including the impact on risk probability and impact ratings
- An update on the status of issues contained in the issues register
- Information on actual versus budgeted expenditure
- Current or potential problems that could hamper project goals

Stettner (2018) suggests that we should also add the following dimensions to status reports:

- Achievements in the past month and planned actions for the next month
- Schedule status relative to planned timelines
- Project 'blockers' and decisions that need to be taken to move forward

Keep in mind the value of graphs and charts when disseminating reports. You may be familiar with the saying 'a picture is worth a thousand words'. A graph showing the project tracking in terms of schedule or cost is often more easily understood than a table of numbers and dates (or long textual descriptions). However, do not always assume that the graph, in itself, is sufficient. Often, the graph needs to be accompanied by some text for background context and explanation. That is why it has also been said 'a picture is worth a thousand words, but do not forget the thousand words'.

Communication monitoring and control is closely related to stakeholder monitoring and control, a topic we turn to next.

10.10 STAKEHOLDER MONITORING AND CONTROL

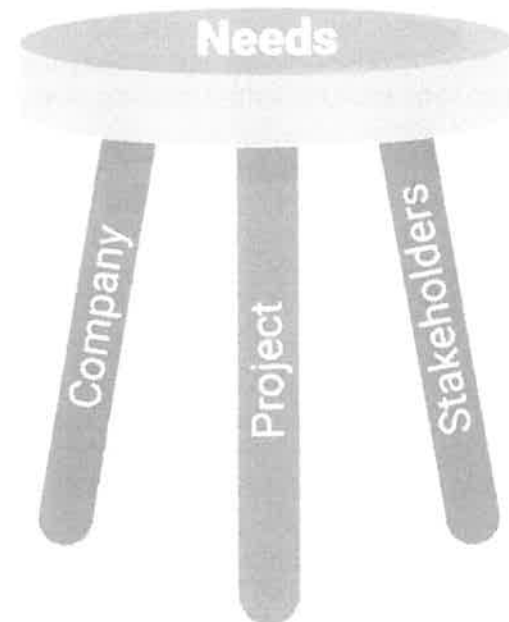
Traditionally, stakeholder management has been handled under communications management, but that has changed recently with the recognition that stakeholder management is not merely concerned with providing stakeholders with information, but is aimed at 'engaging, influencing and involving the stakeholders in the problem-solving and decision-making process' (Burke, 2018: 147). The project manager needs to obtain (and retain) the buy-in, motivation and commitment of key stakeholders; otherwise the project will be doomed to failure. A key aspect of this process is building healthy relationships based on regular communication, trust, fairness and integrity. When issues arise during the course of the project, and important decisions need to be made, relevant stakeholders should be asked for their input and involved in deciding what should be done. This will harness their commitment going forward.

Stakeholders include (MacLachlan in Knipe et al., 2017: 125):

- people involved in doing the project work;
- influential people who have a vested interest in the project and whose cooperation is vital for project success; and
- people who will be affected by the outcomes of the project (e.g. users).

Their needs, expectations and fears can change over the course of the project and, for this reason, the project manager needs to keep an eye on their position. This must be done to prevent the project suffering as a result of a lack of trust, low motivation and negative attitudes (Knipe et al., 2017: 126). It is not always possible to meet the needs of all stakeholders; stakeholders often have conflicting needs. The project manager's job is to balance stakeholder needs against what is good for the company and what is good for the project. Sometimes trade-offs are necessary (Burke, 2018: 147). Ideally, the stakeholder, project and company needs should all be met, as reflected in the following figure where the analogy of a three-legged stool is used.

If only one or two elements are considered, the stool will not hold up; it will topple over. Project objectives should firstly be aligned with company objectives. In satisfying these two entities, the project manager should point out to stakeholders how their personal needs are also met (e.g. job security, career advancement, job satisfaction, pride in the company, work-life balance etc.). So, what is good for the project should be good for the company and good for the project stakeholders – a situation where all three needs are aligned.



(Source: EDGE Learning Media (Pty) Ltd, 2020)

Figure 10.5: Meeting the needs of the project, the company and stakeholders

In Unit 3, you learned how a stakeholder analysis plotted the varied needs and expectations of the different project stakeholders. Without this understanding, it would be difficult to influence stakeholders and appropriately manage their expectations. It is critical to monitor how stakeholder attitudes evolve as the project unfolds. When their expectations are managed well, they will feel positive about the project and will contribute to its success. Poorly managed expectations will lead to poor motivation, criticism and sometimes even sabotage (Tasmanian Government, 2011).

We know that plans seldom work out exactly as intended. So, while a project may have devised a thorough stakeholder management plan, things are bound to turn out somewhat differently as the project progresses. Relationships with stakeholders need to be closely monitored to ascertain whether all stakeholders are fully on board. If not, stakeholder engagement plans may need to be modified. Monitoring stakeholder management is 'the process of monitoring project stakeholder relationships and tailoring strategies for engaging stakeholders through modification of engagement strategies and plans' (Burke, 2018: 148).

The *Project Management Methodology Guide* (European Commission, 2016: 59) states that a once-off stakeholder analysis exercise is not sufficient. New circumstances arise as the project unfolds, and people may start to react differently and their attitudes may change. It is therefore imperative that you, as the project manager, continually monitor and assess these changing responses and attitudes so that you can change the manner of your engagements with stakeholders where necessary. You want to ensure that stakeholders are actively involved in and contributing to your project. Unenthusiastic responses and open opposition are obvious signs that something needs to be done to win people over to the cause of the project.

When people are not actively working for the success of the project, there are certain measures that you can take to gain their cooperation. You can appeal to others by providing them with a sense of meaning. Five areas of meaning are outlined by Keller and Aiken (in *Tasmanian Government*, 2011: 80):

1. *Positive societal impact:* Show them how the project will make for a better society, a better world, and a better-off community.
2. *Improve the customer's well-being:* Through the benefits offered by a high-quality product or responsive, caring customer service.
3. *Improve the company:* By developing an edge over the competition and becoming the market leader.
4. *Develop team spirit:* By providing team members with a sense of belonging and working toward creating strong interpersonal relationships.
5. *Deliver personal benefits:* Through personal development, greater autonomy, or higher pay.

When stakeholders fail to adequately contribute to the project, you can try to gain their commitment by making them aware of (Tasmanian Government, 2011: 80):

- the reason for the project (in other words, why the company needs it);
- the risks to the company of not implementing change; and
- how the project contributes to achieving the company's strategic objectives.

As issues arise during the project, the project manager needs to give stakeholders a platform from which to share their views. These stakeholders will expect the project manager to provide them with constructive responses. In circumstances where project opponents arise, the project manager needs to firmly challenge their views by providing objective information or dealing with any perceived personal threats related to the project (Tasmanian Government, 2011). In this way, stakeholders' commitment can be maintained for the duration of the project. If users start to

become antagonistic toward new project processes after beginning to view process changes in a bad light, the differences between the old and new process need to be explained, and it must be established why the changes were needed.

When issues are raised by stakeholders, they need to be addressed immediately to avoid false information and bad feelings being spread. When dealing with resistance, it is important to get the project sponsor involved in addressing this resistance; people need to see that senior management are supportive of the project. It may be that your attempts to quell opposition meet with limited success and you may feel like any choice you make will end up harming one or more stakeholders. In such cases, you need to somehow limit the destructive influence and impact of the dangerous stakeholders (*Tasmanian Government*, 2011: 89). Burke (2018: 150–157) highlights why it is so crucial to continually monitor and control stakeholder commitment. We now focus on some of those key stakeholders and the impact of failing to retain their commitment and support during project execution:

- *The client (or project sponsor)*: Monitor the sponsor's satisfaction with respect to how the project is meeting their requirements. The sponsor provides the all-important funding for the project, which can easily be withdrawn in the face of conflicts of interest developing. It is vital that the project manager keeps them actively involved in the project and informed on progress. Responding appropriately to any developing doubts or changes in their minds can be the difference between retaining their ongoing visible support for the project or losing it.
- *Functional managers*: They provide human resources to work on the project. If issues arise, these managers can potentially pull their resources from the project, thereby threatening the achievement of the project deadline.
- *Users*: Failure to address resistance to change can result in the outputs or products of the project not being utilised, which may lead to project failure.

10.11 PROCUREMENT MONITORING AND CONTROL

Many projects rely on other organisations to assist them in carrying out project work. This can be in the form of providing raw materials and components for a manufacturing or construction project. Outside organisations are also often called upon to render services that the project organisation is unable to perform in its own capacity. Project procurement involves the purchasing of goods and services from these suppliers. The procurement process needs to be actively managed to ensure that the right goods (and services) are delivered in the correct amounts and required quality, on time and within budget. The monitoring and control of procurement involves the management of relationships with suppliers, the tracking of supplier performance, and controlling aspects of the procurement process where necessary to facilitate project success (Burke, 2018: 263).

During the execution phase, the procurement contract and process are monitored against the procurement plan to (*Tasmanian Government*, 2011: 114):

- determine whether planned outcomes are on track to being achieved;
- take corrective action where targeted procurement outcomes are not being achieved;

- ascertain whether the designated procurement procedures are being followed;
- establish whether performance is in line with agreed standards; and
- confirm whether the various parties involved in the procurement process are carrying out their responsibilities, as per the contract and plan.

It is easy to think that a procurement contract should be sufficient to ensure that the supplier keeps their end of the bargain and performs adequately. However, as with most things in life, where people are involved there will always be instances of negligence, tardiness and lack of responsibility. It is therefore essential to oversee suppliers and take corrective action in cases where they perform inadequately. It is not unusual for supplier purchases to account for more than 50 per cent of the project budget (Burke, 2018: 269). For projects where purchases form a high percentage of the overall project budget, it is critical to monitor and control supplier performance so that project budgets are not exceeded. Late deliveries by suppliers is another crucial area to monitor, as they can cause project completion dates to be deferred, particularly where procured goods or services are required as inputs for project activities on the critical path.

An important component of procurement monitoring and control is contract management. We discuss this subject before moving on to measures the project company can adopt to control the costs and schedules of orders from suppliers.

Contract management

Vendor performance needs to be monitored to ensure that the supplier is meeting its obligations in terms of the contract. The project organisation also needs to check that it is abiding by the responsibilities laid out for itself in the contract (*Tasmanian Government*, 2011: 115). As a 'living, breathing' document, the contract management plan should be updated when needed during the course of the contract.

Where the plan calls for monitoring the performance of the supplier, this must be performed. Where the plan calls for penalties to be applied for unsatisfactory performance, these penalties must be applied. When the plan calls for particular steps and approvals for placing an order with a contractor, these activities need to be monitored to ensure they are in line with the plan. Procurement-related issues arising during the project execution phase need to be appropriately responded to.

Where the plan calls for suppliers to regularly report on progress and issues, these aspects need to be monitored to ensure they are carried out accordingly (*Tasmanian Government*, 2011: 116). Procurement documents should be checked to ensure compliance with procedures (Burke, 2018: 264). Importantly, good relationships with vendors need to be cultivated to facilitate smooth commercial transactions.

Monitoring and controlling schedule performance

The project company depends on the suppliers to deliver orders when needed, but it cannot be assumed that everything will happen in line with plans and expectations. It is important for

the company to follow up with the supplier after placing the order to check that everything is in order for meeting the delivery date. Burke (2018: 274) states that the project manager or 'project expeditor' (in the case of a bigger, complex project that demands this separate role) should be in regular contact with the supplier after the purchase order has been placed to ascertain the following from them:

- Have you received the order together with instructions?
- Do you fully understand what is required?
- Have you scheduled the job for your production line?
- Have you ordered the necessary materials for production?
- Is work progressing in line with meeting the contracted delivery date?

The answers to these questions provide critical information to enable the project company to take proactive measures to control any issues that arise and to ensure the order is received on the due date (Burke, 2018: 274). If the delivery is forecast to be late, there may still be opportunities for the project company to get back on schedule. Burke (2018: 273) outlines the following options:

- Place the order earlier than you normally would to accommodate the longer lead times
- Speed up the delivery by using a faster mode of transport (e.g. an aeroplane). Be aware that this will increase costs
- Make up for the late delivery by performing the associated activity in a shorter time than planned (crashing)
- Make up for the late delivery by running the activity in parallel with another activity, which was originally scheduled to take place later (fast-tracking)
- Reduce the scope of work associated with the relevant activity if this does not negatively impact the achievement of project objectives

When orders are delivered to the project company, these need to be checked for quantity and quality. The delivery note (supplied by the vendor) should align with the purchase order (Burke, 2018: 267). If goods do not conform to quality requirements, they will need to be returned and arrangements made to expedite another shipment.

Monitoring and controlling costs of purchases

The project budget will make allowance for how much can be spent on purchased goods and services. As purchases are made during the course of project execution, actual expenditure should be compared against the budget (the plan) to ensure there are no deviations. Cost performance should be documented relative to budget in the form of regular budget reports. It may happen that previously unforeseen financial expenses need to be accounted for, in which case the budget should be negotiated with the project sponsor and, on approval, updated (Tasmanian Government, 2011: 115).

The degree to which procurement costs need to be monitored is often determined by the nature of the contract signed with the supplier. If it is a time and materials contract, then it could be to the advantage of the vendor to bill for as many hours as possible, without paying much attention

to its productivity. As the project company's representative, you would need to keep a close eye on the vendor's progress and be aware of any changes made to the agreement. If your company has signed a lump-sum contract with the vendor, then the vendor will be highly motivated to carefully monitor its effort and productivity. If it fails to do so, it will not make its planned profit margins. In such a situation, the project company will probably not have to monitor costs to the same extent as it would with a time and materials contract (University of Wisconsin, n.d.).

10.12 REVIEWING THE MONITORING AND CONTROL PHASE

At the end of the monitoring and control phase, the project manager should conduct a formal review of the phase to report on the progress made relative to project objectives. This should be presented to the project steering committee for approval to continue to the final stage – closure. If the committee is not completely satisfied and feels that there is still outstanding work to be done, they will request that the project manager tie up these loose ends before progressing to the next stage with all its associated activities.

When reviewing the monitoring and control phase, and filling in the stage-gate review form, the project manager will need to confirm that appropriate answers and explanations can be given to the following questions.

Scope

- Has the full scope of project work been carried out?
- Has the formal change-control process been followed with all additions to project scope?
- Has the project charter containing the original scope of work been updated to reflect adjustments to scope?
- What impact have scope adjustments had on schedule, cost and quality?

Schedule

- Has the project been completed within schedule?
- Have project activities been carried out in line with the planned sequence, as reflected in the Gantt chart?
- What time slippages were experienced?
- Where slippages occurred, what corrective measures were applied to get the project back on schedule?

Budget

- Is the overall project on budget?
- Which aspects of the project did not adhere to budget? Why?
- Where actual costs exceeded planned costs, what corrective measures were taken to meet the budget constraint?
- What impact did these corrective measures have on costs?

Quality

- Do the deliverables meet required quality standards?
- How was the quality of deliverables checked?
- What quality issues were detected and how were these fixed?

10.13 PROJECT MANAGEMENT IN PRACTICE

Siphokazi Benghu is a business analyst at Value Insurance. The company's head office is located in Durbanville, Cape Town. The company recently undertook a knowledge management initiative (project) to address the fact that numerous workers with vast experience were reaching retirement age, and would soon be leaving the organisation. Management was alarmed by the impact this loss of knowledge would have on the business and was determined to put mechanisms in place to codify that knowledge into a central repository where staff could access it as and when needed.

However, the knowledge management project that was subsequently implemented was not the best solution to the problem. It failed to deliver the benefits the project sponsor had hoped for and was criticised as 'an outright failure and waste of resources' by the CEO, Jack Broadbent, who subsequently tasked Siphokazi to investigate and formally report on project results and the reasons for failure. Two weeks later, Jack Broadbent received his highly anticipated report by email and quickly printed it out for review and annotation. He had a meeting in 45 minutes and a busy schedule for the rest of the day, so he only read the one-page executive summary, which detailed the major findings and conclusions. These were outlined in list form, as follows.

Project results

- *Limited contribution by staff to the knowledge base:* Staff were not asked to contribute, felt unable to write useful knowledge articles, or were unwilling to add their knowledge to the knowledge base. They did not see the value in contributing to the repository or utilising the repository in their day-to-day work. The project manager encountered strong resistance to change and stated that people were unwilling to share information because they perceived knowledge to be a source of power.
- *Staff did not use the knowledge base:* They felt the articles that had been added to the repository were not relevant to their practical day-to-day work or were difficult to interpret and apply. Some were sceptical about how the project contributed to the achievement of the organisation's objectives.
- *Technical factors:* Users did not adopt the system because they were unfamiliar with the intricacies of the 'ServiceNow' platform and the process for creating articles or accessing articles.
- *Budget exceeded:* The final project costs exceeded the allocated budget by 32 per cent.
- *Reduced operating income and increased complaints:* The loss of knowledge linked to the retirement of long-time employees was associated with marked declines in the level of customer service and a steady drop in underwriting income from new insurance policies.

The executive summary also mentioned the key causal factors behind the project failure. Some of these included the following:

- *Lack of performance measures:* This meant that project progress could not be clearly ascertained.
- *Inadequate support from senior management:* Inadequate resource provision and the absence of political support were cited as contributing factors. Management did not have any vision for the project, and as soon as problems began to arise, they withdrew their support. Little incentive was provided for staff to contribute to or use the knowledge management system. Senior management did not appreciate the benefits of a knowledge management system to share knowledge with each other.
- *Limited evaluation and control activities during project execution:* This was partly caused by a lack of planning and the absence of performance indicators.
- *Culture:* There was an organisational culture in which staff were unwilling to share their knowledge.

(Source: EDGE Learning Media (Pty) Ltd, 2020; adapted from Frost, 2014)

Required:

- Discuss what measures should have been taken to ensure user engagement, and predict what impact this would have had on the project.
- Provide examples of measures that could have been used to monitor and control project performance.
- Critique the project manager's engagement of senior stakeholders.

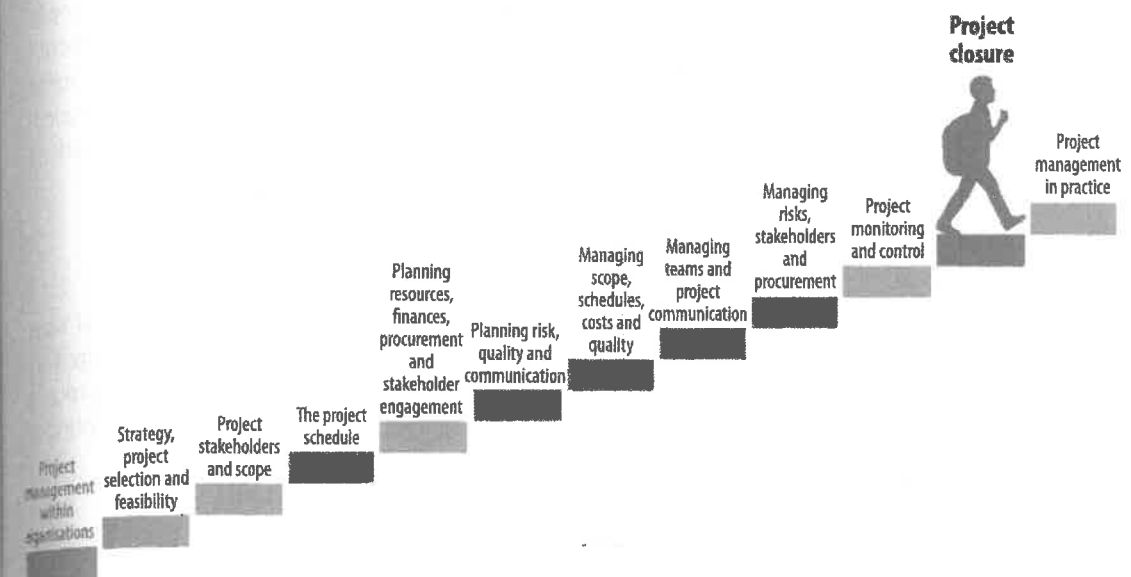
10.14 SUMMARY

Project plans, risk management plans, schedules and budgets are developed for good reason. They not only guide execution-phase activities, but they also provide a baseline from which to monitor whether actual performance is in line with planned performance. Where actual performance falls behind planned performance, the project manager needs to take action to get the project back on track. Your success as a project manager will be largely determined by the quality of your project deliverables and your track record in completing projects on time, within budget and within scope. Some of the key topics we have discussed in this unit are the importance of avoiding scope creep, the use of tracking Gantt charts to monitor schedule performance, and actions that can be taken to reduce the duration of project activities and keep costs within budget. We have discussed the importance of quality assurance and quality control. With regard to controlling risk, we looked at the four risk responses – mitigation, avoidance, transfer and acceptance. Furthermore, we highlighted the importance of engaging stakeholders and establishing strong lines of communication. Your project is almost complete, but you still have some important work to do in the final phase.

11

PROJECT CLOSURE

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11.1 INTRODUCTION

You are a project manager and your team has just completed the design and development work for a new software system that will measure staff productivity. You have handed the deliverables over to the customer, who has readily accepted them and appears excited about the benefits that the newly released solution will deliver. Believing that the project is done and dusted, you turn your attention to the new project you have just been tasked with, as it looks extremely complex and the task ahead feels overwhelming.

No sooner do you get underway with your new project than all sorts of gremlins from your last project start to raise their ugly heads. The project office needs to know what value the productivity system yielded, but you failed to close out the financials. The customer wants you to tweak a few things on the user interface, but you are not sure whether such a request falls within the terms of the project charter. One month after delivering the product, the financial department approaches you to find out why the vendor to whom you outsourced some work is still billing on the old project. Did you forget to inform them that the project was finished? The customer approaches you, complaining that the users do not know how to capture their tasks and task durations, and demands that training and user manuals be provided. You are wondering whether training was included in the contract, or if this constitutes new work. Last, but not least, after agreeing with the customer to add two new features to the software, you realise that the software developers have been deployed onto another project and they have no capacity to do this work. If you do this work for the customer, it will not be compensated, and you are concerned that you may be setting a precedent for further free work.

Every project has a beginning (initiation and planning phases), a middle (execution, and monitoring and control phases) and an end (closing phase) (Watt, 2014: 25–26). In the preceding

units, we have covered the first four phases of the project. All the work that needed to be done in order to produce the required deliverables (whatever has been produced by the project) should have been completed. But that does not mark the end of the project. What remains are some important tasks that need to be performed in order to bring the project to a fitting conclusion, where the customer and other stakeholders are satisfied with the project outcomes and various administrative aspects have been closed off.

The benefits of adopting a structured closeout process

Project managers often fail to tie up all the loose ends of their project in a methodical way. Uncompleted tasks divert your attention from your current project, sapping your energy and reducing your productivity. These problems can be avoided if you make use of a structured process to close your project down. According to Athayde et al. (2013: 179), the benefits of adopting a structured closeout process are the following:

- The ability to measure what value the project has realised by fully accounting for the costs and benefits
- Better control of project costs
- Greater satisfaction among the customer and other stakeholders
- Organisational learning, which arises from taking time to reflect upon lessons learned and considering improved ways of working on future projects
- A sense of contentment among project team members, knowing that the project is complete and realising what they have achieved

How the closing phase of a project fits into the project life cycle

Let's step back for a moment and consider project objectives and how the closing phase of a project fits into the project life cycle. A project is made up of numerous interrelated tasks that are carried out in a defined sequence with the purpose of creating a new product or service, within a set time frame (Tasmanian Government, 2011: 145). All work should be completed by the defined end date. Ultimately, the outputs produced should create beneficial outcomes for the company in the form of increased revenues, reduced costs, higher productivity, improved competitiveness, increased customer satisfaction, or other worthwhile results. The purpose of completing all the project work is to accomplish such objectives. Projects aim to deliver what they promised to deliver at the outset. If the project achieves this, the customers will be satisfied and accept the product (Barron and Barron, 2016). At this point, the project can be concluded.

Given the introduction and background context provided about the project closure phase, we are now ready to dive into the details of the key tasks involved in this final phase.

After studying this unit, you should be able to:

- finalise and conclude project procurement contracts;
- outline the process of project acceptance;

- conduct a project review and create a performance report;
- document lessons learned from the project for application in future projects;
- hand over a project;
- update project records and release project resources;
- explain the process of reviewing the project closure phase; and
- apply your knowledge of project closure processes to both fictional and real-life cases and scenarios.

11.2 KEY TERMS AND DEFINITIONS

The following key terms and definitions are applicable to this unit:

- *Acceptance criteria*: Measurable yardsticks used by the customer to establish whether the project deliverables are in order (i.e. meet their requirements), which provides an objective standard for deciding whether to accept the deliverables.
- *Closing phase*: Final phase of the project life cycle that brings the project to a formal end and includes activities such as handing over deliverables to the customer, assessing project performance, capturing lessons learned, compiling a final project report and archiving documents.
- *Closeout meeting*: A get-together with the project team to identify lessons learned and what improvements can be made for future projects. Closeout meetings should also be held with the customer or project sponsor to bring the project to a formal close and lay the foundation for further potential work in future.
- *Closeout report*: A final project report summarising performance in terms of schedule, budget and quality. It also includes a write-up on how the project outputs will support the achievement of business objectives, as well as a list of lessons learned for future guidance.
- *Deliverables*: Major products that need to be produced or results that need to be achieved by project completion.
- *Milestone date*: A targeted date for the achievement of a significant event, which represents a substantial accomplishment toward project progress and completion.
- *Objectives*: The end products that the project seeks to deliver, as well as schedule and budget performance criteria. Objectives may also include the outcomes that the organisation hopes to achieve as a result of incorporating the new product or service into its operations. Outcomes include customer turnaround times, staff productivity, cost savings, revenues and other such measures, in order to improve the company's competitiveness and help ensure its survival.
- *Performance review*: An evaluation of a project team member's performance, including their contribution in terms of technical and social skills. The primary focus of the review is for development purposes, but it is also often used to inform decisions about salary increases and promotions.
- *Project review*: An assessment of overall project performance in terms of the results achieved. Data gathered should be verified and documented in the closeout report.
- *Retrospective*: A look back at the project to identify what worked, what did not and what lessons can be used to improve future project performance.

11.3 PROCUREMENT CLOSURE

Procurement contracts are where project work has been contracted out to a vendor or supplier. There will be several tasks the project manager needs to carry out to finalise the closure of these contracts. Kogon et al. (2015: 196) and Athayde et al. (2013: 185) list some of these tasks as follows:

- Verify whether the supplier has fulfilled all the terms of the contract.
- Confirm that the supplier has handed over all deliverables. In the case of outstanding items, make the vendor aware of such and ensure that they put together a plan to complete them timeously.
- Let the contractor know when final bills need to be submitted for payment.
- Check whether you have settled bills for all suppliers.
- Release all vendors from their obligations once fulfilled.
- Reconcile invoices and payments made, ensuring alignment with the contract. Report any discrepancies to the accounts department.
- Confirm that contracts have been signed, vetted and approved by your legal department, and then archived.
- Compile a report on the vendor's performance and share this with the procurement department to aid with future supplier-selection decisions.
- Provide feedback to the vendor on their performance.

When procurement contracts are closed out, the project organisation must verify that the work outlined in the contract 'was completed accurately and satisfactorily' (Barron and Barron, 2016). The contract should describe those terms and conditions required for satisfactory completion. If the buyer is satisfied that the seller has properly performed their side of the bargain, then they should provide the seller with a formal written notice of their acceptance of the deliverables, confirming that the contract is complete. Where the administration of vendor contracts is handled by your procurement department, you will need to inform them when the vendor has fulfilled all their obligations so that they can give formal notice of acceptance to the vendor (Barron and Barron, 2016).

If the buyer is not satisfied with the seller's outputs, then the seller needs to take corrective action. The buyer should not keep silent about any dissatisfaction until the end of the project; instead, they should monitor the seller's performance throughout the course of the contract and let them know immediately if their performance is not up to scratch (Barron and Barron, 2016). This gives the seller time to fix things timeously and helps to keep the project on course to achieve its scheduled deadline date. It also aids the seller's cash flow position by ensuring that payment is not delayed.

Typically, final payment is made to the supplier or vendor only upon completion of the contract. Whilst progress payments are typically made throughout the course of the contract, the final payment often constitutes a relatively high percentage of the overall amount paid. For example, even if only ten per cent of the work remains to be completed by the vendor, the final payment might be up to 25 per cent of the total bill. This is because, at this stage of the project, there are

usually some tricky problems remaining that the supplier has not yet resolved. The resolution of such problems can be frustrating and time-consuming from the seller's perspective, leading to procrastination and delays. From the buyer's perspective, the resolution of these problems can sometimes mean the difference between project success and failure. A relatively high final payment therefore acts as motivation for the seller to fully complete their side of the contract and to do so promptly and accurately (Watt, 2014).

Once the vendor has resolved all the outstanding problems and completed all work to the satisfaction of the buyer, the project manager can sign off the contract and request the accounting department to make the final payment. In making this payment, the vendor should know that the payment constitutes fulfilment of the contractual agreement and no more payments are due (Watt, 2014). At this point, the accounting records can be closed, and a financial analysis can be performed to determine actual cost against the budgeted project amount (Clements and Gido, 2012: 284).

In the real world of commerce, performing accounting and making payments can be quite disorganised. Invoices are often submitted sometime after the project has been effectively completed. It can take time and effort to finalise invoices, and this is followed by further lags in billing and payment. What is more, payments can be made only once the project organisation has verified that the vendor's work has been fully completed to a satisfactory level. In order for the project organisation to protect itself against any disputes with the vendor, it is essential to organise and store all documentation and correspondence for easy retrieval. This includes contracts, status reports, invoices, change requests and records of financial transactions. In the absence of such evidence, the buyer will not have a leg to stand on if they wish to file a lawsuit against the vendor for contractual non-compliance (Larson et al., 2013: 510).

Having submitted a formal notice of acceptance and a finalising payment to the supplier, the project organisation still needs to write up a formal performance review on the supplier. This assessment gauges the supplier's performance in terms of quality of deliverables, scope adherence, schedule adherence and price. In addition, it may also evaluate 'soft' factors such as responsiveness, professionalism, integrity, level of cooperation, support, service and friendliness. The performance review helps the organisation decide whether the supplier should remain on the organisation's list of qualified suppliers. If the company has had negative experiences with the supplier, other organisational departments and stakeholders need to be put on guard when they are looking for a contractor to perform work in future. Without a documented performance review, as well as the accompanying decision on whether or not the supplier should be on the organisation's list of preferred suppliers, the organisation can end up facing the same problems from the same supplier with future contract work.

Finally, the supplier contract should also be reviewed to ascertain how appropriate it was. It may be that the organisation believes that the incentive structure sent the wrong signals and needs to be adapted in future. Alternatively, they might feel that they took on too much risk and wish to transfer some of this risk to the supplier in any future projects (Watt, 2014). Any changes should be incorporated into the contract wording and given to the legal department for approval.



EXERCISE 11A

- (i) Explain why it is important to actively monitor your supplier's work and to provide immediate feedback on their performance throughout the course of the contract.
- (ii) Judge how effective a relatively high final payment is in motivating a supplier to resolve all outstanding issues.
- (iii) Critique the following statement and substantiate your answer.

In evaluating a supplier's performance, the project organisation is purely interested in hard factors such as quality, schedule and price.

11.4 PROJECT ACCEPTANCE

The project manager and project team ultimately work toward meeting the sponsor's or customer's expectations. Once these expectations are agreed on, a formal, written notice of acceptance indicating successful completion of the project is given. If the project is performed under contract, then the conditions of acceptance are usually clearly spelled out within the contract. It is one thing to promise that you will deliver something, but it is another thing to fulfil that promise. However, if you carefully monitor and control project progress, making sure that everything you promised to deliver is properly delivered and all acceptance criteria have been met, then the project stakeholders are likely to be satisfied. Obtaining sign-off (acceptance) should then be a mere formality (Barron and Barron, 2016).

Your project cannot end until the customer has given formal, written notice of acceptance. For the customer to be able to approve the product, service or project, they will require records of project information with evidence of satisfactory completion of project terms. As project manager, you need to collate (collect and combine) this information and distribute it to the customer and other relevant stakeholders (Barron and Barron, 2016). Kogon et al. (2015: 198) reiterate that you need a signature as evidence of customer acceptance and project completion. Without this signature, you will face an uphill battle when trying to conclude the project, as you could receive continuing requests to add, change or refine aspects that were already agreed upon. You will probably also face future disagreements and dissatisfaction as you try to counter customer accusations, where they insist that you agreed on or promised something that you did not. Remember, people's memories are fallible, particularly as time progresses. So, be sure to pre-empt such scenarios by documenting their approval in the form of a formally written and signed acceptance note.

Project acceptance should be planned for far in advance. During the planning phase, an acceptance plan should be created, listing the acceptance criteria for project completion (Watt, 2014: 24). If we take the example of a software development project, the project manager will need to scrutinise the acceptance plan to fully comprehend the conditions under which customer acceptance and payment can be withheld.

Let's suppose that all project work outlined in the statement of work has been completed and the final product has been handed over to the customer. If users of the software subsequently experience problems whilst working with the software, does this give the customer the right to withhold payment? Make sure you carefully read the acceptance criteria to be clear on issues such as this. Are you clear about requirements regarding end-user support and training? Does the acceptance plan state that this is the responsibility of the project team? Or does it fall outside the range of the project scope? Make sure that all such aspects are clearly defined at the outset to avoid disagreements and dissatisfaction when it comes time for the customer to sign-off on and approve the project (Larson et al., 2013: 509).

Preparing for project acceptance

If a contract stipulates terms and conditions for project acceptance, make sure you can put a tick mark next to each of these terms so that project acceptance is not held up (Watt, 2014: 159). The presence of one small outstanding item can stall the process and cause you to miss the targeted project completion date. If there are any outstanding items of work that need to be completed, identify who can perform the work and oversee its completion. Double-check that your team has discharged all its responsibilities as outlined in the contract, before requesting customer approval and sign-off. Once you are sure that all the necessary work has been properly accomplished, notify the customer that all contract requirements have been fulfilled (Athayde et al., 2013: 182).

Before you meet with the customer to formalise project acceptance, work through the following checklist to ensure your readiness.

- ☐ Verify that you have complied with all contract provisions and document your compliance against each.
- ☐ Document project outcomes to provide evidence of project value and alignment with customer expectations.
- ☐ Prepare supporting documentation – including acceptance form, source code, process maps, architectural drawings, product warranty, training guide and IT support materials – for presentation to the client.
- ☐ Deliver training to end users and provide them with desktop support materials to aid trouble-free use of the product.

(Source: EDGE Learning Media (Pty) Ltd, 2020; adapted from Athayde et al., 2013: 184; and Hobbs, 2009: 42)

Figure 11.1: Project acceptance readiness checklist

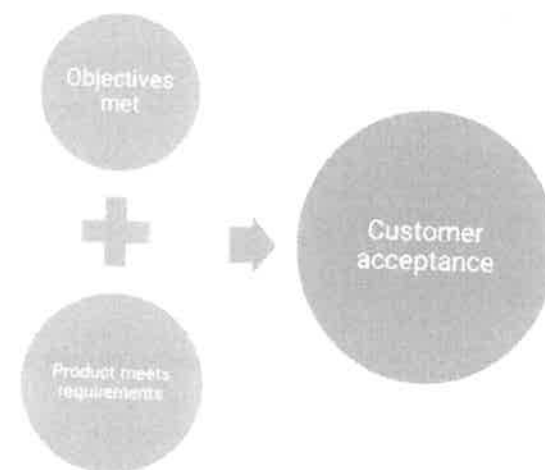
User acceptance tests (UATs)

In the case of software development projects, a customer (the user) is unlikely to provide sign-off if there are no user acceptance tests (UATs), which provide evidence that the product works as

it is supposed to work. UATs put your product to the test by giving end users the opportunity to work through a variety of scenarios to ensure that there are no technical glitches and to determine whether they can achieve various defined outcomes (Hobbs, 2009: 42). The customer, naturally, does not want to face a situation where the new software solution is rolled out, only to be confronted by technical issues that hamper operations and negatively impact customer service. It is important to note that user acceptance tests are not designed to confirm whether the software has all the features that end users desire. That should have been defined up front in the project scope document, and subsequently elaborated on in the course of approving change requests (Hobbs, 2009: 42).

UATs are often compiled by business analysts or software testers, based on information contained within user requirement specifications. The business analyst creates a comprehensive list of scenarios based on the various functions that the software is designed to perform. Representative users are then asked to systematically work through each of these scenarios in a software test environment, rather than the production or 'live' environment. During the test, if the user is able to achieve the stated or desired outcome for each scenario, then they will place a checkmark next to the item on the document. Because of this, these tests will quickly point out whether there are any technical glitches, such as broken links, system freezing or incorrect navigation. Any such technical issues will have to be rectified and subjected to further user acceptance testing to ensure that all required test outcomes are achieved.

By now, you should be fully prepared and ready to meet with the customer or sponsor to obtain project sign-off and acceptance. They will want to know that the project objectives have been attained and the product or service meets their requirements, as stipulated during the initiation phase. The following figure illustrates the 'formula' that leads to the customer accepting the project. You should come armed with up-to-date documentation to provide evidence of achieving the required project results, to facilitate the meeting and to aid the achievement of your objective, which is customer sign-off (Barron and Barron, 2016).



(Source: EDGE Learning Media (Pty) Ltd, 2020)

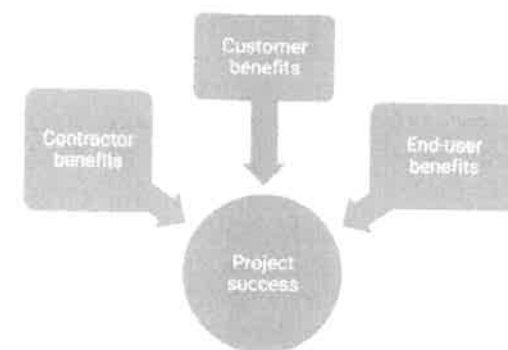
Figure 11.2: The elements of customer acceptance

It is usually good to take the customer through the task list and verify the creation of all required deliverables to confirm project completion (Kogon et al., 2015: 198). Upon receiving sign-off, the deliverables (e.g. software system, user support documentation, policy documentation or building) can be handed over to the customer (Tasmanian Government, 2011: 146). The customer or business owner may wish to inspect the final product before providing sign-off.

Customer satisfaction evaluation

Over and above the formalities of the customer acceptance process, the contractor or project team needs to assess the customer's satisfaction with the project outputs and benefits realised. Once the project is complete, the project manager should meet with the customer or sponsor to obtain this feedback (Clements and Gido, 2012: 294). The process should not be seen as a box-ticking exercise, but an opportunity to obtain frank opinions of what the customer believes was and was not effective. By giving the customer the opportunity to air their grievances, it allows the project manager to reflect closely on how to improve performance and strengthen relationships with this customer or other customers in potential future business dealings. Instead of a face-to-face meeting, the project manager might ask the customer to complete a customer satisfaction survey. A face-to-face meeting, however, has the advantage of offering the interviewer the opportunity to ask probing questions based on customer responses. Apart from this flexibility and the associated clarity it offers, it also typically brings out more comprehensive and detailed input from the customer. In the opinion of Larson et al. (2013: 508), users should also be interviewed to ascertain their level of satisfaction with project outputs. Such an interview will also help ascertain their satisfaction in working together with the project team, the training they were provided, the support they were given and the degree to which they are happy with the contractor's ongoing maintenance.

According to University of Wisconsin (n.d.), 'for a project to be successful, it must provide value to all parties'. For example, the project organisation may have made its targeted profit, but if it failed to meet the customer's scheduled deadline date or complete the work within the allocated budget, then the customer is likely to have reservations. The customer may also harbour a grudge against the contractor if they feel that the product or service has not yielded the expected business benefits. End users could also feel alienated if any of their requests or concerns seem to have been dismissed or conveniently overlooked by the contractor. This will not help the contractor's case in winning future business with the customer or obtaining a good reference. It is, therefore, best to think of the concept of 'win-win'; it is not only good for business, but it is also the right thing to do. As you can see in the following figure, there are several types of benefits that all contribute to the success of the project.



(Source: EDGE Learning Media (Pty) Ltd, 2020)

Figure 11.3: Project success means all parties obtain value

11.5 PROJECT REVIEW AND PERFORMANCE REPORT

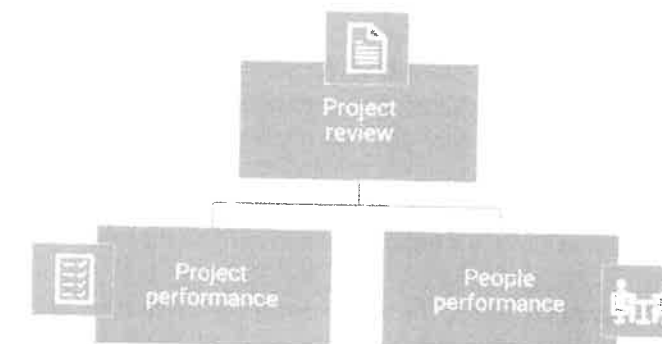
A project review is performed at the end of the project, and the information gathered is analysed and organised into a performance report, which includes project results, lessons learned and recommendations. There are some very important reasons for reviewing and evaluating project performance. Clements and Gido (2012: 286) state that the purpose of a post-project evaluation is to 'review and evaluate performance', as well as to find what lessons can be incorporated into future project work.

The Tasmanian Government (2011: 134, 137) provides the following detailed breakdown of reasons for evaluating project performance:

- To show that the project achieved project objectives, by delivering what it set out to achieve and meeting business needs
- To assess how well the project performed and to ascertain whether it was successful
- To identify which aspects of the project were successful, and to acknowledge the unsuccessful ones and learn from them
- To determine the areas where the project did not deliver in line with expectations and to make appropriate corrections in future projects
- To be able to demonstrate good results to important stakeholders (such as the project sponsor, customer and potential clients), in order to win their support
- To demonstrate to the project sponsor and accounts department that an adequate return on the investment was made

- To aid in the continual improvement of project management processes
- To assess how well the project team performed as a unit
- To assess how well stakeholders contributed toward the project
- To gauge how accurate initial project estimates turned out to be
- To evaluate how quickly and appropriately the team responded to requests for scope changes
- To derive lessons for application in future projects and prevent similar mistakes being made again

Larson et al. (2013: 511) take a more restrictive view of the scope and purpose of the post-implementation review. In their words, the purpose of the project review is to 'assess how well the project team, team members and project manager performed.' So, while the Tasmanian Government (2011), as well as Clements and Gido (2012), focus on the overall project, Larson et al. (2013) focus on the 'people' element – i.e. the project team members and the project manager. In line with this distinction, we will look at these two aspects (people performance and project performance) separately, as shown in the following figure. We will begin our analysis by looking at the principles of people performance.



(Source: EDGE Learning Media (Pty) Ltd, 2020)

Figure 11.4: Project review components

Reviewing people's performance

Evaluating how well project tasks were performed and the effectiveness of project management provides important information for the running of future projects. The performance of the team, individual team members and the project manager should be assessed. Obtaining external input from the customer can also be used to add valuable perspectives. Evaluating a person's performance has a powerful effect in inducing a change in their behaviour, and in providing important information for career development and ongoing performance improvement. In order for evaluation to take place, there needs to be specific evaluation criteria against which performance can be assessed. For evaluation to be effective, project performers need to understand organisational expectations up front and be surrounded by a supportive organisational culture (Larson et al., 2013: 511).

Team evaluation

Project success depends upon a team effort. Individual team members rely upon each other's support in order to fulfil their responsibilities. Input or advice from a colleague may be needed, or a team member may depend upon receiving an output from a colleague that is fully in line with specifications and delivered timeously. Traditionally, when measuring team project performance, organisations have looked no further than time, cost and whether outputs comply with design specifications. Larson et al. (2013: 512) argue that organisations need to look far beyond these by also taking into account team development, group decision-making and problem-solving processes, cohesion among the team members, the quality of information exchanged between team members, and the level of trust within the team. Bearing in mind that the team is responsible for delivering high-quality deliverables and it is the customer and users who can best attest to this quality, it is essential to get an indication of customer and user satisfaction when evaluating team performance (Larson et al., 2013: 512).

Larson et al. (2013: 512) maintain that, in order for a team evaluation to be fair and effective, the following preconditions need to be in place before the project begins:

- Measures or standards must be in place for performance to be assessed against. Team members should have a clear understanding of performance standards and project goals. They should believe that their performance goals are attainable and that they will be recognised for good performance.
- Team members should understand what they are responsible for as individual performers, what the team as a whole is responsible for, and how they are expected to contribute toward the team.
- Team rewards should be seen by team members as being adequate, or else they will have little motivation to look beyond their own, narrow self-interest. If management gives the impression that it is 'every man for himself', an air of competition and strife will prevail within the team.
- The team should be given adequate authority and decision-making powers to be able to manage their own short-term challenges.
- The organisational culture at large should breed a high degree of trust, to stimulate collaboration and cooperation within the team.

Team evaluation surveys

A team evaluation is typically conducted by means of a survey that is administered by the human resources department. A Likert scale is usually employed with selections from a range of numbers (e.g. one to five), to indicate the level of agreement or disagreement with a statement. Larson et al. (2013: 513) provide a sample survey, with the following suggested items:

- The team displayed a sense of working together toward a common purpose
- Each team member willingly contributed toward the achievement of team goals
- Individuals demonstrated respect toward others' opinions
- Team members felt encouraged to raise objections and freely express their views
- Interactions between team members were facilitated by a congenial atmosphere

Once the surveys are completed and returned, the results are documented and a facilitator or senior manager meets with the team to review the patterns that emerged. The survey results should give a strong indication of the level of team development, strengths and weaknesses, as well as what can be done to improve team dynamics in future project work. Improved teamwork can be evidenced by better intra-team communication, a sense of team identity and improved team performance (Larson et al., 2013: 513).

In addition to evaluating overall team performance, it is equally important to evaluate individual performance. The evaluation is often performed by the project manager or the individual's functional manager. These days, increasingly, a 360-degree evaluation is conducted, where all role players impacted by the team member's performance are surveyed. This can include the project manager, colleagues, subordinates and customers. The intention of these interviews is to identify personal strengths and weaknesses with a view to improving performance. The focus is usually on the technical and social skills that the individual demonstrates (Larson et al., 2013: 515).

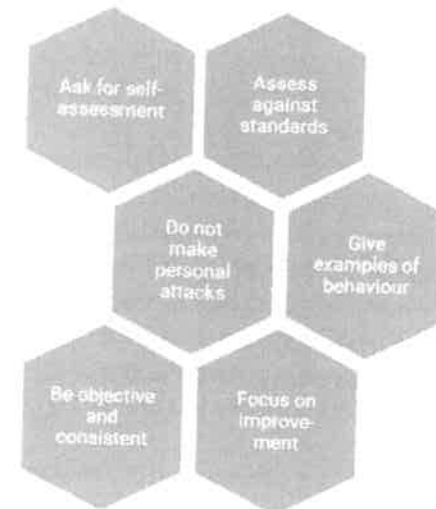
Clements and Gido (2012: 285) suggest that the project manager write up an individual report on each team member, outlining the new knowledge the individual has acquired as a result of the project experience, and identifying areas where further development is needed. A variety of methods can be used to perform the evaluation, including the following (Larson et al., 2013: 515):

- An informal chat between the project manager and team member
- A formal report of the individual's performance, which is written up by the project manager
- The completion of survey forms by several stakeholders impacted by the individual's performance

When a project manager sits down with a team member to discuss their performance, they should observe the following guidelines (Larson et al., 2013: 515):

- Instead of divulging their personal opinions and observations up front, it is best that the project manager asks the individual to assess their own contribution to the project. This lends a less critical atmosphere to proceedings and allows valuable information to surface, which the project manager may not have been aware of.
- Steer away from comparing the individual's performance with another team member. This creates defensiveness and diverts the focus away from the purpose of the discussion, which is to improve future performance. Rather, assess the person's performance against expectations and standards that were established at the outset of the project.
- Where behaviour or performance was unsatisfactory, avoid making personal attacks. Instead, give examples of the person's behaviours and describe how this impacted the project or other team members.
- Be objective and consistent in your evaluation of all team members. Any impartiality or use of double standards will breed resentment.
- Focus on how the individual can improve their performance.

The following figure summarises these guidelines.



(Source: EDGE Learning Media (Pty) Ltd, 2020)

Figure 11.5: Guidelines for conducting an individual performance review

Note that it is vitally important that the project manager's performance is also evaluated, particularly in view of the crucial role this individual performs in determining the success of the project. A 360-degree evaluation should be employed, obtaining input from customers, suppliers, team members and senior management. Once again, the focus should be on determining what the project manager can do in future to enhance their performance and contribution to project success.

Project evaluation

An impartial and comprehensive project review depends upon the input of a wide range of project stakeholders, including project team members, the project manager, the project sponsor and end users. Typically, an internal meeting, facilitated by the project manager and including all project team members, is held to obtain input on what worked well, challenges that were faced and recommendations for improvement. But, before convening this group meeting, the project manager should meet with team members individually to obtain their opinions on project performance and their ideas about how future projects could be conducted more effectively.

The advantage of these individual meetings is that team members feel more comfortable in surfacing sensitive matters that, in a group meeting, could easily open them up to antagonism from their peers. Their willingness to divulge such matters to the project manager will depend upon having a sense of assurance that the project manager will treat such issues with the utmost confidentiality. Once the project manager has met with all team members on an individual basis, the feedback obtained should provide a good indication of common issues and patterns, which can then be discussed in the group meeting (Clements and Gido, 2012: 286).

Given this background context, it is worth posing the questions: 'What exactly should be on the agenda for the team meeting?' and 'What topics should be discussed?' Clements and Gido (2012: 286–288) recommend assessing the following eleven areas of project performance:

1. Technical performance:

- How did the final scope of work compare with the initial scope?
- Were scope-change requests managed in line with required approval, documentation and communication standards?
- To what extent were the project budget and schedule impacted by scope changes?
- Was the complete scope of project work performed?
- Did the project deliverables meet customer expectations?

2. Budget performance:

- Did final project costs fall within the allocated project budget?
- Were the projected project costs realistic?
- If the project involved a fixed-price contract, was the targeted profit achieved?
- If the contractor was remunerated for their costs, did the contractor remain within the customer's budget?
- Did any project components exceed their budgets by more than ten per cent?
- If so, what were the reasons for this?

3. Schedule performance:

- Was the actual schedule performance in line with planned performance?
- What were the causes of late completion of project tasks?
- How realistic were the estimated task durations tabled during the planning phase?

4. Project planning and control:

- Was the project planned in sufficient detail?
- Were project plans updated as soon as scope changes were approved?
- Was actual project performance monitored regularly to determine whether the project was on track to achieve its objectives?
- Was project performance data gathered timeously?
- Did the project team make active use of project plans to monitor their own performance and make decisions?

5. Risk management:

- To what extent did unexpected events impact project outcomes?
- What unexpected events materialised that were not identified in the risk management plan?

- Did the risk management plan include all high-probability and high-impact risks?
 - Did the project encounter any unexpected risks for which there were no contingency plans?
6. *Customer relations:*
- Were customers actively involved in decision-making?
 - Were customers informed of emerging problems timeously and asked for their input in solving these problems?
 - Throughout the course of the project, did the project manager enquire into customer satisfaction regarding project status?
 - Was the customer engaged in regular face-to-face communications with the project organisation?
7. *Team relations:*
- Was the team asked for input into project planning?
 - Was there a strong team spirit?
 - How committed was the team to achieving a successful project outcome?
 - Were there any conditions that hindered collaboration between team members?
8. *Communications:*
- Was the team kept up to date with project status and problems?
 - Were communications open and honest?
 - Were communications delivered timeously?
 - How productive were team meetings?
 - How appropriate were written communications within the team and with the customer?
9. *Problem detection and resolution:*
- How easy was it for team members to detect potential problems early?
 - Were team members consulted for their input in solving problems?
 - Was a systematic approach adopted for solving problems?
10. *Lessons learned:*
- Which aspects of the project were carried out well?
 - Which factors hampered project performance?
 - Which positive aspects can be incorporated into future projects?
 - Which undesirable aspects should be eliminated in future projects?
 - If the project could be redone all over from the start, what would you do differently?

11. *Recommendations:*

- Considering all the information gleaned from the feedback, what recommendations do you have for improving future project performance?

The Tasmanian Government (2011: 139–140) breaks down the scope of project evaluation into five dimensions:

1. Performance measured against project objectives and targeted outcomes
2. Performance from the perspective of time and cost – i.e. schedule and budget
3. The quality of project deliverables and customer satisfaction with these
4. The effectiveness of project management processes, as well as the methodology employed to create the project outputs
5. Lessons learned for application in future projects



(Source: EDGE Learning Media (Pty) Ltd, 2020; adapted from Tasmanian Government, 2011: 139–140)

Figure 11.6: Dimensions of project evaluation

The criteria that need to be met in order to ascertain whether the project was a success are summarised in the previous figure. Other such criteria include the following (Tasmanian Government, 2011: 140):

- Project objectives were realised
- Targeted business benefits were attained (e.g. savings, revenue increases, productivity improvements)
- Project deliverables were handed over on schedule and met quality requirements
- Project costs did not exceed budgeted amount
- Risk was handled well

- The project management methodology was followed
- Stakeholder needs were fulfilled
- Lessons were identified and have been documented for future application

The customer is the most important stakeholder, so it is important that the project organisation determine how satisfied customers are with project results. By meeting with the customer, the project organisation can gauge customer satisfaction, and receive valuable information as to how it can enhance its customer relationship, with a view to doing further business together in the future. Clements and Gido (2012: 289) suggest that the project manager, core team members and key representatives from the customer be present at the meeting. It is worth questioning when exactly this meeting should take place.

Clements and Gido (2012: 289) also point out that the customer will be able to assess their satisfaction with the project only sometime after project completion, once enough time has passed for the targeted business benefits to be realised. For example, if the project organisation automates a particular manufacturing process for the client, targeted at reducing the incidence of defects and returned merchandise by 80 per cent, then time will be needed to ascertain the reduction of returned merchandise from the client's customers. Similarly, if a contractor proposes that the new product it develops for the client will produce one million units of sales in the next six months, then it is no use conducting the client satisfaction meeting any sooner than six months after the project is completed.

When conducting the meeting with the customer, it is useful to ask open-ended questions, as this will typically yield a lot more information from the customer than close-ended, yes/no questions. If it turns out that the customer is thoroughly satisfied with the project results, then it is well worth asking the customer if there is any other similar work that they would like you to perform for them. A little bit of probing can potentially open up a mine of opportunities. You can further capitalise on a successful project implementation by asking the customer to provide you with a testimonial, perhaps on your website or company brochure (Clements and Gido, 2012: 290).

By this stage of the evaluation process, you have gathered a lot of information on project performance by way of surveys and meetings. It is now time to analyse and organise your findings in the form of a project performance report.

Final performance report

The final report provides an overview of project performance and highlights important information for improving future project processes. Larson et al. (2013: 510–511) recommend dividing the report into the following sections:

- *Executive summary:* This section should contain key findings from the project review, including a statement as to whether the project goals were achieved and the level of customer satisfaction. A quick review of user satisfaction with project outputs should also be included, as well as the degree to which the outputs are being utilised in day-to-day business operations. A statement on the realisation of project benefits should also be provided, coupled with a breakdown of

performance against time, cost and scope constraints. Key lessons can be incorporated here, together with any major problems that the project encountered.

- *Review and analysis:* A more detailed analysis of findings from the review are included here, as well as an investigation into the root causes of problems experienced. Further detail is provided on the achievement of project objectives, project processes and the use of resources.
- *Recommendations:* The author proposes important improvement actions that are needed for subsequent project implementations. These recommendations typically arise from problems faced and the solutions that were subsequently put into place to deal with them. For example, perhaps the use of a relatively new programming language created various issues, leading to a significant rework. In this case, the author may propose using a more common, stable language in a future implementation. Or, perhaps, a vendor did not deliver in line with expectations, resulting in the project manager recommending an alternative vendor for future projects.
- *Lessons learned:* Arguably the most important element in the closing process, lessons learned will be delved into in more detail in the next section. For now, we can note that the focus here should be on helping fellow colleagues achieve smoother project implementations in the future, and avoiding the pitfalls faced by this particular project.
- *Appendix:* This section is aimed at those readers who wish receive more details in order to find answers to their personal questions. However, this should not be taken to suggest that the appendix section be used as a place to simply deposit a pile of disorganised data. Instead, all data should be relevant, organised and succinctly stated.



EXERCISE 11B

- In your own words, explain why one can often only obtain a fair measure of the customer's satisfaction sometime after the project is completed (e.g. six to 12 months later).
- Discuss the merits of having a concise executive summary within the final project review report.
- Do you think that it is necessary to review the performance of both the project team and individual project members? Substantiate your answer.

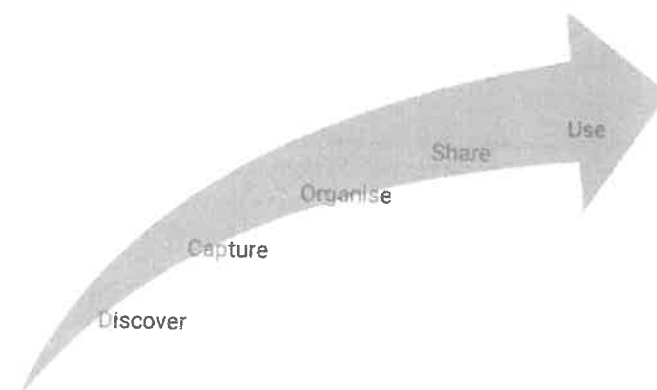
11.6 LESSONS LEARNED

The 'lessons learned' phase of the project review attempts to capture what went well with the project and what went badly, and so, includes both positive and negative aspects of learning (Larson et al., 2013: 516). We can learn a lot from our failures – consider the well-known story of Thomas Edison's almost 10 000 attempts to create a working light bulb. You could say that each 'failure' gave the famous inventor important information about what not to do and prompted him to experiment with alternative techniques, methods and materials, until he finally solved the puzzle. It certainly must have taken an enormous amount of perseverance and a fanatical devotion to make the technological breakthrough and achieve the historical milestone. This

is not to mention the deep thinking and analysis he must have performed as he mulled over different ideas in his mind, contemplated how one thing was related to another and imagined new possibilities.

There is no shortage of people who focus on mistakes and failures to the complete exclusion of successes. Often, these investigations can turn into witch-hunts, where certain individuals are picked out as scapegoats and all blame for project failure is placed upon their shoulders. This can lead to a lot of anxiety, resistance and hostility, which is not a conducive environment for discovering the potential gold that can be mined from project mistakes. To balance the equation, we need not only approach project failures with a more positive attitude, but also need to identify what we can learn from successes achieved during the course of a project. Here, too, there is a wealth of information ready to be discovered by those who are willing to put in some mental effort to extract and analyse it.

What should now be clear is that lessons learned are not simply collected like beach sand in a bucket. On the contrary, they are arrived at through a process of analysis, which typically involves breaking information or feedback down into parts and understanding relationships, particularly concerning cause and effect. Lessons learned are arrived at by 'analysing things that went well (and why) and things that did not go well (and why) in a project' (Athayde et al., 2013). Finding the answer to the 'why' depends on a certain degree of root cause analysis – i.e. getting to the root cause of an issue or problem (or success).



(Source: EDGE Learning Media (Pty) Ltd, 2020)

Figure 11.7: Steps in obtaining value from lessons learned

Why is it important to capture the lessons learned in a project? Firstly, if we learn from our mistakes, we can avoid repeating them in future. Secondly, by establishing what went well with the project, we can make a point of repeating these good practices in future. In the final analysis, when mistakes are avoided and good practices are repeated, our projects deliver higher returns on investment and achieve greater success rates. The previous figure outlines the steps in obtaining value from lessons learned. By sharing your lessons learned with the rest of the organisation,

everyone can benefit. You also need to remember that the value of lessons learned does not lie in discovering those lessons, but in putting them into practice and using them. All too often, lessons learned are documented and then filed away at the bottom of a cabinet, where they are quickly forgotten about and never referred to again (Barker and Cole, 2015: 141–142).

Hobbs (2009: 47) states that lessons learned 'establish what went well, what could have gone better, and what you can do to improve future projects.' It makes sense to learn from our experience, and that includes the errors we have made, as well as the things we have done well. For instance, it may be that you adopted a particular technique that helped make the project run smoothly or, perhaps, you worked with a new supplier who provided an outstanding service. These successes should be documented and disseminated to aid future project success. Learning from your experience helps you (and others) to make improvements when managing future projects (Hobbs, 2009: 47). You are either learning and making continuous progress, or you are stagnating by not learning.

Given the clear benefits of a lessons learned exercise, you would think that all project managers and team members would make every attempt to capitalise on the wisdom and experience gained from their project work. Sadly, this is not the case. Many simply ignore the exercise and quickly move on to new tasks. According to Barker and Cole (2015: 143), organisations do not view this activity as a priority; their focus is on completing the immediate task at hand. They do not understand the value that these lessons represent for aiding future project success. In many cases, lessons may be captured, but that is as far as it goes and these lessons are not distributed throughout the organisation or reapplied. Many organisations do not even reach the point of capturing lessons. That is because they have cultures in which it is simply not acceptable for people to make mistakes. It is not difficult to understand, therefore, why project team members do not openly admit to making mistakes – their position and career could be in jeopardy. Unfortunately, in these cases, problems are only discovered late, which makes them far more expensive to rectify than if they had been addressed immediately. Another organisational culture that hinders learning is where the system incentivises staff to jealously guard their insights, innovations and discoveries (Barker and Cole, 2015: 143–144).

In the opinion of Athayde et al. (2013: 191), organisations do not capitalise on the intellectual capital embedded in their project experience due to a 'lack of time, resources and perceived value'. The authors maintain that, at the end of the project (when lessons learned are traditionally extracted), project resources are either too busy with various other tasks, or there is little incentive to mine the project for lessons. Alternatively, they have been quickly deployed to another project before they can begin capturing and documenting lessons learned. Athayde et al. (2013: 191) also point out that the process of documenting and organising 'lessons learned' requires a lot of hard work, which further demotivates individuals from undertaking the process.

People are generally quite happy to perform work they like or are interested in, but they tend to steer clear of anything that feels like drudgery (Athayde et al., 2013: 202). What practical measures could an organisation put in place to encourage people to capture, disseminate and use the lessons they have learned from their project work? We will now investigate this further.

Motivating the capture and use of lessons learned

One of the keys to getting people to share their mistakes is through the promotion of a learning culture within the organisation. Barker and Cole (2015: 145) offer the following tips to project managers for developing a learning culture within their teams:

- Be big enough to acknowledge your own mistakes and share what you have learned from these experiences
- Instead of being critical when team members own up to their mistakes, respond in a constructive manner by focusing on how they can rectify the matter
- Put things in perspective by letting team members know that making a mistake is not a catastrophe, but rather, an opportunity for learning and avoiding the same mistakes in future
- Make a point of having plenty of informal chats with your team members so that you can develop relationships, build trust and get them to open up of their own free will
- Avoid blaming people for mistakes; rather, focus on putting things right and learning valuable lessons from the experience

It is all very well capturing lessons learned, but that does not yield any value unless the lessons are actively used. Athayde et al. (2013: 201) maintain that people can be motivated to use lessons learned by creating an appropriate metric, where project team members are evaluated against their compliance with these lessons. The effectiveness of this mechanism harkens back to the old saying, 'What gets measured gets done'. The authors also recommend making use of a dedicated subject matter expert (SME) to manage the lessons learned from the various projects going on within an organisation. This work includes collating and documenting lessons learned, getting them reviewed and approved by the project steering committee (PSC), keeping them updated, sharing the lessons learned with the rest of the organisation and promoting the personal benefits of utilising them, and uploading the lessons to a central database where they can be categorised for easy searchability.

Team members would still, naturally, remain responsible for capturing the lessons learned, as they would need to divulge the details of what they have learned from their project experience (Athayde et al., 2013: 202). The advantage of appointing an SME, however, is that it relieves all project team members from the drudgery and burden of completing all these administrative tasks. One person (the SME) is now required to take ownership of the process and is accountable for ensuring that it is properly managed and accomplished.

All too often, new projects begin without using the lessons learned from previous projects to inform project planning and execution. Clements and Gido (2012: 288) share a useful way to overcome this negative tendency. They suggest that organisations should require that all new projects include lessons learned as an agenda item in the project kick-off meetings. This way, they cannot be ignored or overlooked.

An organisation may capture, document and then publish project lessons in a repository, but then find that hardly anybody is using the information. Such a situation often arises when people find it very difficult to search for information that is relevant to their particular project. This usually

happens when the information is poorly classified and arranged. Therefore, at a minimum, the knowledge base should categorise projects by their type or characteristics. In this way, anyone searching the database can be selective and avoid being inundated with a flood of irrelevant information that they have little inclination to sift through (Larson et al., 2013: 523).

The need to avoid including irrelevant information raises the question of how many lessons you should look at publishing for each project. Hobbs (2009: 48) underlines the importance of conciseness in compiling a useful project review document and keeping the lessons learned section brief. The author recommends you aim to compile no more than three key learning points in the document. Such a small number may come as quite a surprise to you, particularly if your project is long and complex. In this case, the author suggests that you provide a quick overview of key lessons up front, and then provide further lessons and details in a separate appendix that readers can view if it is relevant to them. Barker and Cole (2015: 152) suggest that you focus your attention on 'big winners' and limit the number of lessons to no more than ten.

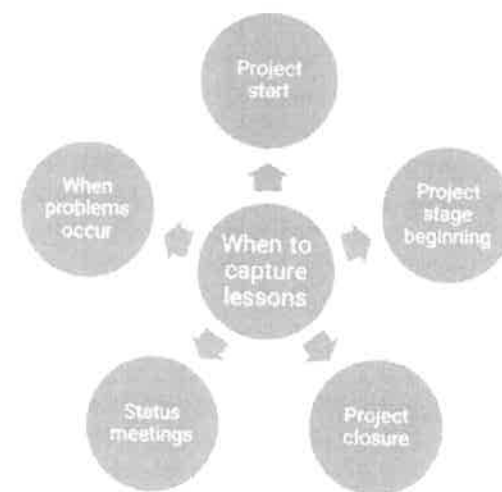
When to capture lessons learned

Now that we have established the importance of capturing and using lessons learned, you may be wondering why we have left a discussion of this topic until the closure phase of the project. What about lessons learned during the planning and execution phases? Would we not have forgotten about these if we only got around to capturing them in the final phase of the project? Yes, that is why it is a good idea to capture lessons learned throughout the duration of the project. For one thing, if you do this, you will benefit by being able to take immediate advantage of the lesson and making appropriate adjustments right away. In other words, you stand to reap benefits in your current project rather than deferring these until later projects. The figure to follow provides a summary of the best times to capture lessons. Barker and Cole (2015: 147) recommend incorporating review points at the following project stages:

- *The start of the project:* This is done to review lessons learned from other projects and determine which ones you can apply to your project.
- *The beginning of a new project stage:* This is done to determine what you learned from the preceding phase and, therefore, what refinements you should make to the project plan.
- *Upon project closure:* This is done to document key project lessons learned for utilisation in your own future projects and to help other project managers and team members to both avoid your pitfalls and benefit from your best practices.

At the start of your new project, Barker and Cole (2015: 154) suggest putting aside a full day for you and your team to review lessons learned from other projects. Athayde et al. (2013: 201), similarly, advocate the sharing of lessons learned at every project status meeting, as many projects conduct status meetings on a weekly or biweekly basis. Another good opportunity for thinking about lessons learned is when things go wrong. At such times, you need to take a step backward and reflect on the causes of the problem and what you need to do differently next time. Perhaps, your supplier has let you down by delivering a component part late and this has put you behind schedule. Instead of remaining quiet, you would probably be a lot better off by making them aware of the consequences, or giving yourself more lead time for future deliveries. Similarly, if

you are picking up a trend where project team members are excusing themselves from meetings with scarcely any notice period, then you need to address the issue before things spiral out of control (Barker and Cole, 2015: 154). Keeping quiet and hoping the problem will go away is no solution. Apart from raising the issue, you need to capture the lesson right away. If you do not, you are likely to forget it.



(Source: EDGE Learning Media (Pty) Ltd, 2020)

Figure 11.8: When to capture lessons learned

What information should you capture in your lessons learned?

In the 'lessons learned' review meeting at the end of the project, there are a number of different aspects that should be covered (Hobbs, 2009: 75), including project planning, general communications, project team communications, documents produced, the management of change requests, risk management, decision-making processes, mistakes made, successes accomplished, team interactions and general project performance. To avoid the discussion going off on a tangent or haphazardly jumping from one topic to another, it is best to break up the agenda by project phase, categories of activity, or other logical criteria.

In terms of details, Hobbs (2009: 48) provides the following starter list of questions to help gather useful lessons:

- What are the key things we learned from this project?
- How accurate was our initial scope?
- Were our original schedule and cost estimates reasonable?
- Did our resources have suitable skills for the project work?
- How effective were stakeholder interactions?
- How good a job did we do in identifying and managing risks?

- Did we utilise the appropriate technology?
- Was our project management methodology effective?
- What issues did we experience with project documentation?

A host of further questions can be posed relating to aspects such as supplier issues, elicitation of requirements, the customer's acceptance of the final product, product testing, the reporting of defects, aspects of quality, and stakeholder involvement. Barker and Cole (2015: 148–152) emphasise the importance of understanding the root causes of problems experienced rather than simply looking at superficial symptoms. They also advocate that lessons contain specific, practical advice, with suggestions of positive actions that can be taken. Hobbs (2009: 47) warns project managers not to make assumptions when identifying lessons around what went well and what did not, and to be on the lookout for opinions that are not grounded in evidence. Instead, they need to ask team members about the facts behind their opinions. This should be done in a sensitive manner to avoid giving the impression of a witch-hunt.

Identifying and using the lessons learned is one of the most important parts of project closure. When you consider the enormous sums of money that are spent on planning a project, it seems absurd that there are typically little to no resources spent on harvesting the enormous amount of intellectual capital acquired from completing the project (Larson et al., 2013: 524).

11.7 PROJECT HANDOVER

Project handover occurs when the final deliverables are transferred or 'handed over' to the customer (Zinque, 2017: 14). If the deliverable is a large item, such as a new manufacturing facility, we would say that the project organisation 'turns over' the facility to the client (Watt, 2014: 23). This event in the project marks the point in time when the project team ends its responsibility for the project, handing over responsibility to the customer, who now takes ownership of the product and project results. A different term for this moment is, in the language of a software project environment, referred to as the 'go live' date. Prior to that point, the software has been undergoing design and development work, followed by testing in a controlled environment. When project handover takes place, we say that the new system is being implemented, or 'rolled out'. It is being moved over from a test environment to a production environment. When this takes place, it is important to ensure that the final deliverables are in line with the specifications.

Before you hand over responsibility, you need to be sure that the customer is properly set up to accept their new responsibilities. It is your responsibility to provide them with the necessary infrastructure, tools, training and documentation so that they can assume ownership and run their new operations effectively (Athayde et al., 2013: 186). If you do not do this, you will be setting the client up for failure. What you want, instead, is a smooth, trouble-free implementation, where the customer can reap the rewards of their investment in the project. End users may be hesitant or anxious about working with the new product. They probably prefer the comfort zone that the status quo offers them. It is your job, as project manager, to ensure they are ready and willing to run with the changes (Hobbs, 2009: 41).

Handover tasks

To ensure that the customer and end users are ready to assume responsibility for the product, there are several tasks you need to carry out, as follows (Athayde et al., 2013: 186–187):

- Put together a handover plan
- Provide the customer with maintenance records and operating procedures
- Make all stakeholders aware of who will now be assuming responsibility for the product
- If required, set up a help desk to provide support to end users
- Update process documentation
- Meet with the customer to let them know that responsibility has been transferred and to receive acknowledgment that the project is complete

Hobbs (2009: 41) suggests the following further actions:

- To help ensure the final product meets with the acceptance of the customer and end users, you should develop prototypes during the execution stage so that they can get a clear idea of what the end product will look like and how it will function.
- You should market the project widely in order to obtain buy-in.
- It is good to provide training to end users so that they are comfortable with operating the product, and you should provide them with supporting documentation that they can readily access when needed.
- You can implement a change management programme to support enthusiastic use of the product once it is implemented.
- You should provide stakeholders with a platform to air their concerns, and ensure that you respond to these appropriately.
- You must provide the customer with the necessary documents and manuals to facilitate implementation.
- You need to train help desk agents to resolve end users' queries and requests once the product goes live.
- You should conduct end-user tests (user acceptance tests) to identify any technical glitches before the product is rolled out.
- You must present the product to the sponsor for inspection and sign-off.

Immediately prior to implementation, it is a good idea to convene all stakeholders to reiterate the importance of project success and to make them aware of detailed roll-out plans. Everyone involved should know exactly what they need to do and when to do it, so that the implementation is a success (Hobbs, 2009: 42). The support function needs to know that, from the implementation date, they will be taking over responsibility from the project team. Once again, it is your responsibility to ensure that they have the necessary knowledge, skills and tools to ensure they can do so with confidence.

As we have previously mentioned, the conditions for customer acceptance of the completed product should be spelled out clearly during the initiation phase. You should check what those conditions stipulate concerning end users' problems with the product. Do such issues entitle the

customer to withhold final payment? What does the contract say about training and ongoing support? Make sure you know whose responsibility these things are. If you do not, you will run into problems obtaining customer acceptance when you deliver your product (Larson et al., 2013: 509).

11.8 UPDATING RECORDS

Before the deliverables can be accepted by the sponsor or customer, the project manager must ensure that all project records have been updated and reviewed. Upon acceptance, the documents need to be arranged in an organised fashion and securely stored (archived) for later retrieval (European commission, 2016: 77). In this section, we will discuss which documents need to be updated, as well as the importance of archiving for future accessibility by stakeholders on other projects.

In order to be able to sign off the project as complete, the customer needs to know whether the project objectives have been achieved. Verbal confirmation by the project manager will not be adequate. You will need to present updated records of project results, providing evidence of meeting the required project outcomes (Barron and Barron, 2016). For full administrative closure, though, many other records will also need to be updated. If certain change requests were approved, resulting in new functions or features being added to the product, then the product specification will need to be updated accordingly. Records showing the roles and responsibilities of resources assigned to the project will also need to be noted, which includes the dates they were enrolled and discharged (Barron and Barron, 2016). Athayde et al. (2013: 182) remind project managers to make sure the following documents and systems are updated:

- Scope definition
- Change log
- Risk management plan and risk log
- Quality control documents
- Records of system maintenance actions

Watt (2014: 23) underlines the importance of ensuring that the project accounting records are fully reconciled. She also notes the importance of writing up the final project reports and disseminating them to relevant stakeholders. Further documents that need updating and closure include the skills inventory (documenting new skills acquired by project team members), the lessons learned document and the document containing key project metrics (results).

With all the project documentation now completed and closed, you need to store it all away in a secure location, where it can still be accessed by appropriate parties when the need arises (Watt: 2014: 161). In the event of future lawsuits or tax enquiries, you will need to disclose project contracts to the relevant parties, demonstrating your innocence or compliance. Your organisation will have policies in place stipulating how long documents need to be stored for and the conditions that apply for retrieving them. When documents are stored electronically, you should be careful to use consistent naming conventions to sort them appropriately and to aid retrieval.

In the case of paper documents, expiration dates will need to be noted and diarised so that they can be destroyed as soon as they become obsolete (Watt, 2014: 161).

Remember that the primary purpose of archiving project documents is to enhance organisational learning and improve project effectiveness. For example, during the planning stage of a new project, a project manager may wish to refer to the schedule and cost information of a recently completed project for input in determining what their own figures are likely to be (Clements and Gido, 2012: 289). In addition, the lessons learned document could be retrieved with a view to avoiding setbacks realised by the previous project and adopting best practices to ensure success. This will not materialise if the documents are stored in the personal folders of the project manager or team members.

You should also make sure that a central repository is created for easy and secure access by all authorised individuals. People should be able to easily search projects by their name and type (Kogon et al., 2015: 199). The story is told of a man who discovered a bag of gold and, in his excitement, he carried it off to a mountain and buried the bag in a place he believed no one would ever discover. In his haste, though, he failed to make a note of the exact coordinates of his buried treasure. Sometime later, when he returned to the mountains, he searched and searched to no avail, eventually dying of thirst (Kogon et al., 2015: 198–199). This story demonstrates the consequences of burying valuable intellectual capital from projects in places where they cannot be accessed by other people, so be careful not to do that.

Creating a secure, but easily located, archival system is not too complicated. All we need to make sure of is that we use logical, consistent and approved file-naming conventions to help others locate our documents. We can leave all the fancy algorithms associated with this to our computers. Clements and Gido (2012: 289) recommend also keeping a backup copy of all documents in a separate archive, just to be safe.

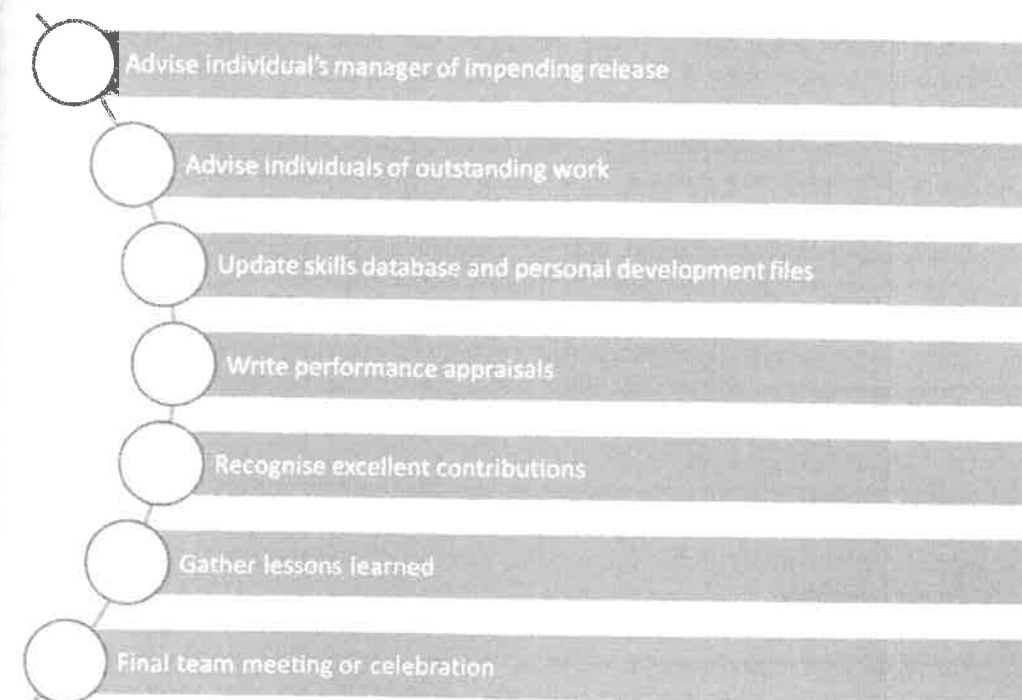
Does all project documentation need to be archived? This is unlikely; however, all important documents and records should be archived. This includes signed contracts, approvals, reports, technical specifications, architectural diagrams, invoices, receipts etc. (Clements and Gido, 2012: 289). Watt (2014: 161) highlights the following documents for archival: project charter, scope definition, project budget, change requests and approvals, and lessons learned documents.

11.9 RESOURCE RELEASE

Now that all the project work has been accomplished, it is easy to imagine that the project is now complete. However, there is a lot more to releasing your resources than the activity would seem to suggest. Athayde et al. (2013: 187) provide a comprehensive list of tasks the project manager needs to undertake, as follows:

- Bring all team members together for a final meeting or, preferably, put together a celebration event (if appropriate)
- Let each team member's department manager know that the project work is complete, and that they can expect their employees to be returned on a certain date

- Write up individual performance appraisals, assessing each team member's contribution toward the project
- Give special recognition to those individuals who performed outstanding work
- Make special arrangements to help those individuals who urgently need to develop their skills in order to be an asset in the workplace
- Update the skills database with the new skills that project team members have developed as a result of their recent project experience
- Interview the team to obtain their input on what lessons can be learned from the project
- Make individuals aware of any outstanding work that needs to be completed before they can be released from the project
- Update team members' personal development files with the training they have received and the training they will need in order to enhance their contributions toward future projects



(Source: EDGE Learning Media (Pty) Ltd, 2020)

Figure 11.9: Tasks associated with release of team members

Releasing and reassigning resources

Upon concluding your project, you can release your team members so that they can be reassigned to a new project or return to their functional managers. You should let their functional manager or new project manager know some time in advance about their termination on the project, so that the managers have sufficient time to plan for the team members' active utilisation upon release (Barron and Barron, 2016). Some project participants will complete their project responsibilities a

long time before the project end date. For these individuals, make sure you give their functional managers enough advance notice of their impending release. Some team members may not be reassigned to their original duties or to a new project; instead, they may be allocated an operational or support responsibility for the product that the project has produced.

For contractors, the end of the project may be the end of their work for the organisation for the time being; in some cases, there may be follow-up work that they can be allocated to. If the contractor has produced sterling work and possesses highly sought-after skills, then the organisation may hire the person in a permanent capacity, perhaps related to supporting the project's product (Larson et al., 2013: 510). Where the person's work with the organisation comes to an end, you can assist them by offering outplacement services or career counselling (Larson et al., 2013: 508).

Most team members would have invested a lot of time and effort in the project, not to mention the emotional bonds they may have developed with fellow project participants. It is therefore important to recognise this and show a sense of appreciation and empathy when you release them. People are emotional beings, and it is important that team members feel they have been treated fairly by the project manager at the moment of departure. The way they have been treated can significantly colour their impressions of the project as well as their attitude toward future projects (Tasmanian Government, 2011: 146). Sometimes a project ends prematurely because it fails to deliver upon expectations or there is not enough budget to continue. It is easy for team members on such projects to feel that they are responsible for the project failure, and they may be concerned about what comes out in the corporate grapevine. It is particularly important, in such cases, that the project manager relieves them of these anxieties and lets them know that the project demise was not their fault. This is why it is good to hold a closeout meeting and end on a positive note (Athayde et al., 2013: 187).

Before releasing resources, do make certain that they have completed all the tasks assigned to them. If you let them go too early, you will have a hard time in reassigning the outstanding activities.

Project celebration

Before the project team disbands, it is usually a good idea to arrange an end-of-project celebration event, particularly when a project has been successful. The occasion provides an opportunity to express appreciation for team members' efforts and to recognise their accomplishments. If you can get one or more senior stakeholders to come along and say a few words to honour the team's achievements and compliment them on their efforts, that will usually mean a lot to your team. Beyond the pride felt in being part of a winning team, people particularly value individual recognition. Therefore, a project manager should find some nice, meaningful words to share about each team member's individual contribution. If the project manager does not use the event as a platform for bestowing individual recognition, then it should at least be expressed by way of a word of appreciation in private or by sending a personal note to each individual.

Apart from the opportunity to celebrate the completion of the project and to recognise people's contributions, a celebration brings a sense of closure to the project, as it formally marks the end. If the project has placed a lot of demands on team members and has extended over a long period

of time, they will feel the need for it to culminate in a coherent conclusion. You do not want your team to feel that the project fizzled out on a damp note, with nothing marking the end of something significant and representing the start of something new.

Project celebrations come in all forms. They can be formal or informal; for example, you could end the project on an informal note with a pizza party or snacks and drinks for your team. Alternatively, you could arrange a formal event where team members are invited to speak about project accomplishments, and awards or certificates are handed out to individual team members. If you are not able to hold a party, then you should, at least, put some time aside to send emails to individual team members expressing your appreciation for their efforts. However, make sure that your messages are meaningful, personalised and from the heart. You could also put together a letter of reference for each team member or endorse their skills on LinkedIn. Getting the project participants together for a team picture or team video can also make for a memorable conclusion to the project (Urizar, 2013: 15; Kogon et al., 2015: 200; University of Wisconsin, n.d.; Tasmanian Government, 2011: 148; and Barron and Barron, 2016).

Apart from informal recognition, project managers should also write up a formal performance evaluation for each individual, identifying specific skills that they have developed as a result of working on the project, as well as pinpointing areas where they need to further develop their skills. If the team member reports to another manager, then the project manager should send a copy of this appraisal to their manager (Clements and Gido, 2012: 285). Top performers will use these reviews as part of their ongoing drive to gather good testimonials in order to enhance their curricula vitae (CVs). At the other end of the spectrum, underperformers will be motivated to put in extra effort when they know that the project will conclude with a formal evaluation of their contribution (Hobbs, 2009: 49).

One final thing to remember when releasing project resources is to update the skills inventory. In this way, when the organisation needs people with particular skills and experience to work on a new project, they will be able to find suitable personnel by quickly accessing the database.

11.10 REVIEWING THE PROJECT CLOSURE PHASE

Many organisations evaluate project performance at the end of a project phase (which is known as *stage-gate reviews*). This is when they decide whether they are prepared to proceed to the next stage, and, unless certain criteria are met, the project cannot proceed. A review at the end of the project closure stage is a bit different, since it is the last stage of the project – i.e. there is no next phase to move on to. But what is important in reviewing this stage is to establish that all actions that need to be taken have, in fact, been taken. Once the project sponsor has this assurance, the project can be safely concluded.

According to Larson et al. (2013: 505), the major closure task in a project is to obtain the customer's approval and acceptance of project deliverables. However, there are a host of other tasks besides this that need to be carried out for the project to be recognised as fully complete. Larson et al. (2013: 527–528) suggest making use of a project closeout checklist to ensure that all necessary tasks are carried out. A slightly adapted version of this list is shown in the following figure.

Number	Item description	Status	Comments
1	• Customer has accepted project deliverables		
2	• Project performance has been judged against objectives stated in project plan		
3	• Actual project cost has been calculated and compared with budget baseline • Impact of approved changes to budget have been documented		
4	• Completion dates for milestone deliverables have been compared to schedule baseline • Impact of approved changes to schedule baseline have been documented		
5	• Impact of approved scope changes on performance, cost and schedule have been documented		
6	• Operations management has taken on responsibility for product or service delivered by project • Documentation for operating and maintaining the product or service has been handed over to operations • Operations has received training on new product or service		
7	• Project personnel have been reassigned to other areas within the organisation		
8	• Project documentation has been organised and archived		
9	• Lessons learned have been documented		
10	• A date has been set for reviewing project outcomes (performance) post-implementation		

(Source: EDGE Learning Media (Pty) Ltd, 2020; adapted from Larson et al., 2013)

Figure 11.10: Project closure task checklist



EXERCISE 11C

- (i) Match the concepts in Column A with their correct explanations in Column B.

Column A	Column B
a. Lessons learned	1. Lessons learned are used
b. Project handover	2. What went well and what did not go well with the project

c. Reasons for poor application of lessons learned	3. Transferring deliverables and ownership to the customer
d. Value realised from lessons learned	4. People do not see the value in it and do not have enough time to put aside for this task

- (ii) Explain the extent to which a culture where it is unacceptable to make mistakes is associated with an organisation that does not learn and improve.
- (iii) Justify why Thomas Edison's almost 10 000 failed attempts to create a *working* light bulb should not be seen as a failure.

EXAMPLE 11 A (The Gautrain Buddy mobile application)

Niemand and Chauke (2017: 5) have produced some interesting research on the adoption of a mobile application by regular commuters of the Gautrain in South Africa. The Gautrain Buddy mobile application was developed by Theo de Bruin in 2013, and was voted the best application of the year by MTN in 2014, which is evidence of a highly successful project. The application displays Gautrain timetables, sends notifications of arriving trains and helps calculate fares, among other features. As of 2016, commuters numbering up to 45 161 were being moved on average per day by the Gautrain (Maqutu in Niemand and Chauke, 2017: 4).

The research tried to determine how useful Gautrain commuters found the application to be. Furthermore, it attempted to define the relationship between system acceptance (by users) and subsequent use of the application (a topic that we have discussed under both the project acceptance and project review sections of this unit). The researchers hypothesised that if commuters perceived that the system was easy to use and also useful for them, they would be inclined to actively use the system. How easy the application was to use was associated with the following factors:

- It was easy to learn how to use the application.
- It was easy to control the different elements of the application.
- It was easy to understand what to do in order to interact with the system.
- The application offered flexibility of use.

- It was easy to become proficient on the application quickly
- It was easy to use

The following dimensions were used to determine the perceived usefulness of the application (Niemand and Chauke, 2017: 7):

- It enables a person to perform a required task quickly.
- It improves a person's performance of a task.
- It helps a person to be more productive.
- It makes a person more efficient.
- The application enables a person to carry out the task more easily.
- The application is useful to the person.

Research results showed that 81 per cent of survey respondents believed the application was easy to use, while 69 per cent of respondents indicated that the application was useful. The application was used by 78 per cent of respondents, showing that it helped them plan and manage their trips in terms of the information it gave on Gautrain and Gautrain bus arrival/departure times. It appears, then, that the Gautrain Buddy application project was a remarkable success.

(Source: EDGE Learning Media (Pty) Ltd, 2020; adapted from Niemand and Chauke, 2017: 6–7)

11.11 PROJECT MANAGEMENT IN PRACTICE

Like South Africa's Gautrain project, but on a larger scale, it is useful to investigate the challenges faced by South Korea in developing its railway for their Korail high-speed express train (KTX Railway). The railway extends from Busan in the south, to the capital, Seoul, in the north (a distance of 412 km). When the project was initiated, a budget of \$ 5.8 billion (83.28 billion rand) was set aside, and the project duration was expected to last seven years. That was before the project encountered serious obstacles, causing the final cost to balloon to \$ 18.4 billion and the duration to exceed 12 years. To support an average train speed of 300 km/h, the railway required a higher quality of construction, which was further complicated by the construction of exceptionally long tunnels and special bridges. The process of obtaining permission to operate from urban areas, through which the railway would pass, led to delays, which were compounded by extended negotiations in acquiring land from owners.



(Editorial credit: icosha / Shutterstock.com)

Figure 11.11: Seoul, KR - JANUARY 9, 2019: Perspective view of Korean Korail high-speed express train or KTX Railway that stopped at Seoul station

Amidst the enormous size and complexity of the project, as well as the proliferation of contractors and stakeholders, there was a lot of confusion around who was responsible for what. This led to poor communications, poor planning and rushed project execution. Unverified designs resulted in a host of change requests and a huge amount of rework. There was no integrated system that all stakeholders could access to obtain a holistic view of the project, as well as to focus on a microscopic level of project detail. It was at the microscopic level that schedules were produced, but contractors did not have access to an integrated system that provided them with a bird's-eye view of the entire project schedule and how their work linked to other contractors' activities. The lack of an integrated system for the project also hampered risk management, particularly in terms of being able to identify risks from the various project sections, which could lead to delays and cost overruns.

According to Clements and Gido (2012: 283), the project delays were attributed to 'management issues, frequent changes, inappropriate project delivery system, lack of a project scheduling tool, and redesign and change orders.' The authors list the following three primary lessons that came out of this megaproject:

1. While there are some similarities between traditional railway and high-speed railway construction, they are fundamentally different, particularly in terms of technical requirements.
2. The project suffered from the absence of adequate project management skills to deal with risks that threatened to delay the project and to deal with the resultant crises after the delays were realised. The absence of a risk monitoring system meant that trigger points and appropriate response plans were not identified.

3. Project managers need to take into account social and political factors in order to run successful projects. Disagreements and hostility between the central and local governments created serious complications, negatively impacting the project plan and schedule.

(Source: EDGE Learning Media (Pty) Ltd, 2020; adapted from Clements and Gido, 2012)

Required:

- (i) In your own words, explain the three primary lessons learned from the KTX project.
(ii) Do you think that the project was a success or a failure? Substantiate your answer.
(iii) Appraise the extent to which risk management practices impacted project success.

11.12 SUMMARY

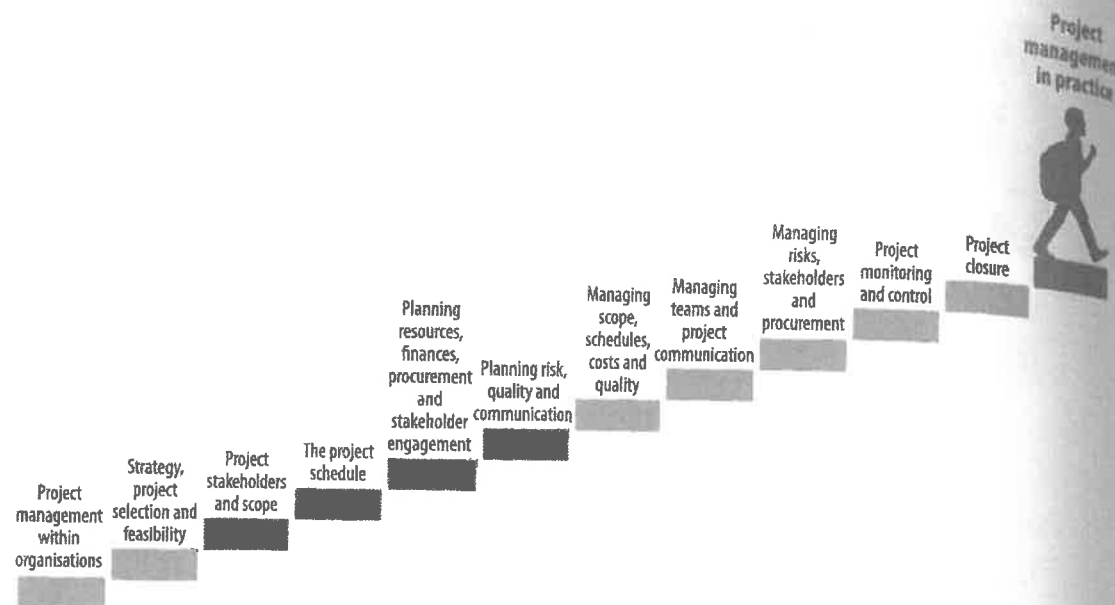
The final phase of the project (project closure) is often overlooked in terms of its significance and, consequently, neglected by many project teams. Some argue that the chief goal of this stage is to obtain customer acceptance of the final project deliverables. Others argue that the primary intent of this stage is to gather 'lessons learned' from the project so that future projects can adopt best practices and avoid making the same mistakes. But, besides these tasks, there are other important tasks that also need to be completed. Final payments need to be made to suppliers, and supplier contracts must be closed off. The project should be evaluated and a performance report compiled. Lastly, project deliverables need to be handed over to the customer.

Product and project ownership should also be transferred to the customer once they have been adequately briefed or trained to assume this responsibility. Project records and documents need to be updated and archived. Resources must be released and reassigned as soon as they have properly completed all their allocated tasks. Finally, a celebration can be held with the project team and customer to mark the end of the project, thank people for their efforts and recognise achievements.

12

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12.1 INTRODUCTION

Deborah has started a new job as a project manager in a small software development company. She is responsible for seven software development projects, each with its own product, client and deadline. She is working with a different team for each of these seven projects. Some of the projects have been active for months, and some will be starting in the next few weeks.

The first thing Deborah does is try to create copies of the project documentation for each project so that she can see how much work has been completed, and how much still needs to be completed. However, she finds that most of the existing projects have no detailed documentation on file. Most of these projects use Trello (an online project management tool) for day-to-day management, but there does not seem to be anything written up about the projects' deliverables, scopes, budgets, or time frames. She approaches the executive manager about this problem, and he responds by saying that he has all of the information in his head, and does not need to document it. Deborah decides that she is going to manage her new projects differently, by creating proper documentation that can be shared and consulted by any relevant parties.

In this unit, you will have the opportunity to take what you have learned throughout the textbook and apply your knowledge to different scenarios and case studies. This will help you to contextualise and internalise the principles and practices you have covered. You will be demonstrating your knowledge of the course content in this unit as you complete the activities

that follow. The activities in this unit cover each unit you have studied to date. In each section, you will be presented with case studies that require you to develop a project management document that you would use in a real-world setting.

The experience you gain from completing this unit will prepare you for project management in a real-life workplace. There are multiple case studies provided for each stage in the project management life cycle, and you will develop many different project documents based on the details provided in these case studies. As you create these documents, you will be expected to refer to the previous units and refresh your memory on what you have learned.

It is important that you access the online tools and platforms available to you when working your way through this unit. You will need to use various pieces of software to create the project documentation. Each exercise will indicate the online tools used to create these documents, although you can also view and adjust generic templates of some of the documents. Please note that if you use a template, you are required to adjust it so that the content reflects the specifications provided in the case studies. Each of the programs that you use will have an option to *export* or *save* the document as a PDF file. You must save each document you create as a PDF file in order to share it with your lecturer or tutor.

Some free programs can be used to create the necessary project documentation, such as Google Docs and Google Sheets. To access these programs, you simply need to log in to your Gmail account and search for Docs or Sheets in the application (app) list. The following link can be used:

<https://docs.google.com/>

Another free program that you will come across in this unit is Draw.io, which is a flow-chart application that gives you easy tools with which to draw structures and maps. The following link can be used:

<https://www.draw.io/>

Paid programs such as Microsoft Office 365 are also very useful. If you have a South African identification (ID) number and are under the age of 24, you may use Office 365 for free. Visit the following link to create your free account and register your copy of the program using your valid South African ID number:

<https://mahala.ms>

After studying this unit, you should be able to:

- apply your knowledge of project management processes to both fictional and real-life cases and scenarios.

12.2 PROJECT INITIATION IN PRACTICE

In Unit 2 and Unit 3, you learned about the theory of project initiation, which includes the following:

- Strategic planning and project alignment
- Feasibility studies
- Project proposals
- Project stakeholders
- Project charters
- Project scope
- Work breakdown schedule

The project management documents you will develop for the project initiation stage include:

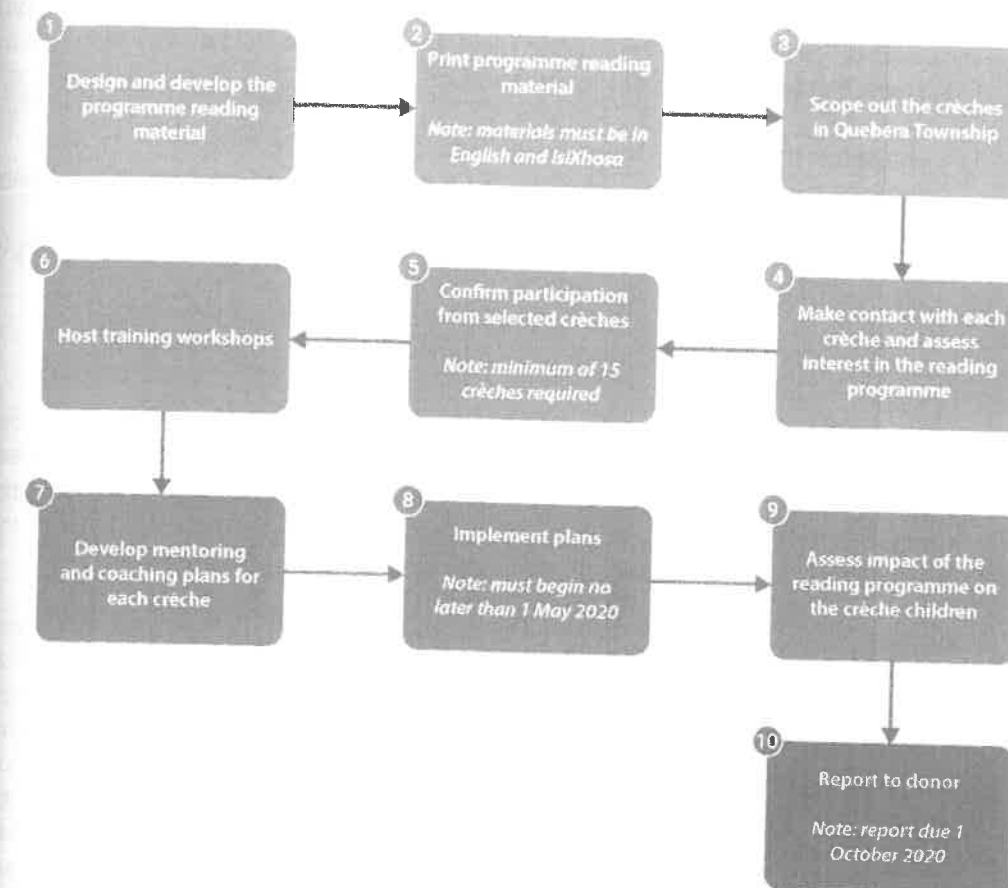
- a road map;
- a work breakdown structure (WBS); and
- a stakeholder map.

12.2.1 Case study: Road map

Project road maps are a broad overview of a project in the form of a diagram, and show the main steps or phases required to achieve the desired end product. In the same way that a map shows you how to get from point A to point B, you can think of a project road map as a set of directions guiding you to your end destination, which is the finished product or completed project objectives.

The road map is used as a first step before unpacking the project actions in detail through the WBS and a Gantt chart. The road map is a useful tool to orientate your team members to the project's outcomes and objectives, and ensures that your project is aligned to your organisation's strategy (Project Management Institute [a], 2017: 41). The following is an example of a road map for a reading programme for informal crèches in townships:

Crèche reading programme - A road map



(Source: EDGE Learning Media (Pty) Ltd, 2019)

Figure 12.1: Crèche reading programme road map example

As you can see in this figure, minimal detail is provided in the road map. The details of each step are added later when they are unpacked into smaller steps in the WBS and Gantt chart (Project Management Institute [a], 2017: 36). A road map only needs to provide enough detail for you to begin orientating your project team toward the project outcomes and deliverables. The road map example in the previous figure also provides a few important notes about project requirements, such as the required number of participating crèches and deadline dates. It is important to ensure that your team is on the same page about what needs to be done at this stage of the project.

In more complex projects, the road map will contain a higher level of detail, including notes and deadlines, the geographical scaling and product iterations, and other details (Project Management Institute [b], 2017: 178). In many income-generating projects, where a product or service is being

developed to sell for profit, the project road map will also show the point at which a project is expected to start generating income and when it will generate profit (Project Management Institute [a], 2017: 45). In these instances, your road map will be linked to your project cash flow documents. You would refer to your project cash flow projections and include those dates in your road map. The main functions of a road map are to:

- ensure that the project is aligned to your organisation's strategy;
- provide a high-level overview of the project steps or phases and important requirements;
- create a team orientation tool; and
- create the foundation for more detailed project documentation, such as Gantt charts, WBSs, and risk assessments.

Case study

One of Deborah's software development projects is a music app. Her client wants to create a music app that showcases African music. After creating accounts, users will be able to search for music by artist name, country and traditional style. Musicians will be able to create accounts and upload their music for others to enjoy. Musicians can also decide which of their songs may be listened to for free, and which songs require payment.

Creating an account as a musician or a listener will be free of charge, and the app will generate income through advertisements, which users are shown while using the app. Users can choose to pay for a premium version of the app, which necessitates a once-off fee for an advert-free experience. The client also requires that the app be available in English, French and Swahili. The client wants the app administrator (one of his staff) to be able to perform certain functions via the admin dashboard. These functions must include blocking and banning users, as well as promoting language-specific adverts for users, based on their country or location. For example, adverts in Swahili will only be shown to users who have selected Swahili as their preferred language on the app. English users will only see adverts in English.

The client wants a basic, functioning prototype of the app to be presented in six weeks. This prototype must then be tested with a group of users and musicians to see if the various functions work. Based on the tester feedback, the prototype will undergo further development and at least another two rounds of testing. The final release of the product will be available on both iOS (Apple Corporation's operating system) and Android platforms, and must be ready for launch within six months of the project start date. Deborah's company is responsible for every stage of the process, including prototype development, testing, design, layout and coding, as well as submitting the final products to Google Play and the Apple Store for release.

Deborah's team consists of the following:

- Herself, as the project manager.
- A designer, who is responsible for the look and feel of the app.
- A team of software developers who will code the app. This team is also responsible for managing user testing and feedback.

- A finance manager, who creates and submits invoices to the client once the different stages of work have been completed. The client must be billed at each major stage for any work completed to date.



EXERCISE 12A

Draw a road map for Deborah's project containing the main steps, as per the client's requirements. There should be enough detail in the road map that Deborah can onboard all members of her team quickly. Your Road map must:

- cover all the main stages of Deborah's project;
- list the steps in a logical sequence, with arrows showing the process movement;
- list any important requirements or notes concerning the client's needs;
- be neatly organised with appropriate spacing; and
- be clearly legible.

You may want to start this exercise by creating a rough road map on a piece of paper. When you have the basic process ready, start building the steps in Draw.io (you will need to connect to the Internet to do this) and link the steps together with arrows flowing in the correct direction. You may need to tweak and adjust the diagram as required.

You should use the Draw.io program to create your road map. When you have finished your assignment, save it as a PDF and upload it to your learning management system (LMS) profile. You can then view a completed sample road map online.

12.2.2 Case study: Work breakdown structure (WBS)

A work breakdown structure is the next step in managing your project. The WBS takes the steps mapped out in your road map and unpacks these in greater detail, providing a step-by-step guide of how to implement your project and reach your desired results. The WBS provides a detailed summary of all the tasks or activities required to reach the project outcomes and objectives. It allows you to start allocating tasks to people or departments in greater detail, and to assign deadlines for each task or activity.

If your project does not start with a predefined budget from your client, the WBS can form the basis of developing a budget, as a cost is assigned to each activity or task. If you do not unpack your project into smaller, more detailed tasks or activities, you run the risk of scope creep, as tasks get added ad hoc during project implementation. By listing all anticipated tasks or activities at the onset, you limit the risk of activities that will increase costs or affect deadlines being added by your client or your team (Kerzner, 2017: 61).

WBSs are generally developed in a spreadsheet, like Microsoft Excel or Google Sheets. A WBS is used to create a Gantt chart, which we will explore in the next section. The tricky part of making a

WBS is knowing how much detail to include. It is necessary to go into enough detail to accurately list everything that needs to be done, so that you can allocate people and deadlines to tasks in order to reach your end goal. However, too much detail in your WBS can overwhelm your project team and make it difficult for them to read and internalise the WBS. Here is an example to illustrate this.

Sufficient detail	Too much detail
Task: Translate programme materials	Task: Translate programme materials
1. Secure translators 2. Submit text to translators 3. Get weekly feedback on translator progress 4. Translators to submit final translated text by due date 5. Translators are paid	1. List available translators 2. Contact each translator and obtain quotes 3. Select the best translation quotes 4. Place translators on contract 5. Submit translators' signed contracts to Finance 6. Submit text to translators 7. Get weekly feedback from translators 8. Translators to submit final translated text by due date 9. Translators to submit invoices for payment 10. Forward invoices to Finance for payment 11. Confirm that payments were made

(Source: EDGE Learning Media (Pty) Ltd, 2020)

Table 12.1: WBS detail examples

If you go into the level of detail illustrated in the 'Too much detail' column, your WBS will be extremely detailed and lengthy, and you run the risk of your project team feeling swamped by too much information. A good WBS should list enough tasks or activities to make it clear to everyone how the work will be completed, without overloading them with information.

It is a good idea to review your completed WBS and see if you can collapse the activities into one another, without making it unclear how the work should be done or who should do it. The 11 steps listed in the second column can be safely collapsed into the five steps in the first column, without losing any key activities.

Let's revisit the township reading programme for our example of a WBS. We already have the road map, so now we need to break this up into the various activities that are listed under each stage of the road map. To do this, start off with the road map stages as headings, and add the tasks or activities needed to achieve each stage underneath the heading, in the order that each stage occurs. We will unpack the first two stages in the township reading programme road map. You will see that we have numbered the road map stages (level 1), and broken down the stages into substages (level 2), before breaking the substages down into activities (level 3).

Level 1	Level 2	Level 3
1. Design and develop the programme reading material	1.1 Content development	1.1.1 Secure content developers
		1.1.2 Send content specifications to content developers
		1.1.3 Get weekly feedback on developer progress
		1.1.4 Content developers submit draft content for review
		1.1.5 Send review comments to content developers
		1.1.6 Content developers submit final content
		1.1.7 Content developers are paid
	1.2 Translation	1.2.1 Secure translators
		1.2.2 Send text to translators
		1.2.3 Get weekly feedback on translator progress
		1.2.4 Translators submit draft content for review
		1.2.5 Send review comments to translators
		1.2.6 Translators submit final content
		1.2.7 Translators are paid
	1.3 Graphic design	1.3.1 Secure graphic designers
		1.3.2 Send text to graphic designers
		1.3.3 Get weekly feedback on graphic designer progress
		1.3.4 Graphic designers submit draft content for review
		1.3.5 Send review comments to graphic designers
		1.3.6 Graphic designers submit final content
		1.3.7 Graphic designers are paid
	1.4 Print programme reading material	1.4.1 Secure printers
		1.4.2 Send print-ready documents to printers
		1.4.3 Receive printed materials from printers
		1.4.4 Printers are paid
2. Scope out the crèches in Quebera township	2.1 Obtain details on crèches	2.1.1 Internet research on crèches listed in Quebera township
		2.1.2 Contact local non-governmental organisations (NGOs) for names of crèches in the area
		2.1.3 Contact the local Department of Social Development for names of crèches in the area
	2.2 Develop a list of crèches to be contacted	2.2.1 Develop final list of all known crèches in Quebera township with physical addresses and contact details

(Source: EDGE Learning Media (Pty) Ltd, 2020)

Table 12.2: Quebera township reading programme WBS in tabulated format



EXERCISE 12B

Have a look at the following online resource for creating a WBS. It shows a number of different ways to build your WBS. As you know from Unit 3, various forms can be used to represent a WBS, depending on the project at hand.

<https://www.projectmanagementdocs.com/template/project-planning/work-breakdown-structure/#axzz67JLWWnlz>

Using the road map you developed for Deborah's music app project, create a WBS table. Use the example of a tabulated WBS from the link provided in this exercise to create your own. The first level of your WBS table should indicate the following three application builds:

1. Alpha build
2. Beta build
3. Release build

The 11 tasks identified in the road map will form the second level of your WBS. You will need to allocate these 11 tasks to the three build types given in level 1. You will also need to break down these tasks into smaller tasks that will form the actual work packages (third level) for the project. Make sure that your WBS covers all the steps of the road map and describes these in sufficient detail, in order to enable Deborah's project team to allocate roles and responsibilities for individual tasks or activities.

Note: Please save a copy of this WBS, as you will use it to develop the Gantt chart later in this unit.

You can create your assignment in Microsoft Excel or Google Sheets. When you have finished your assignment, save it as a PDF and upload it to your LMS profile. You can then view the solution online.

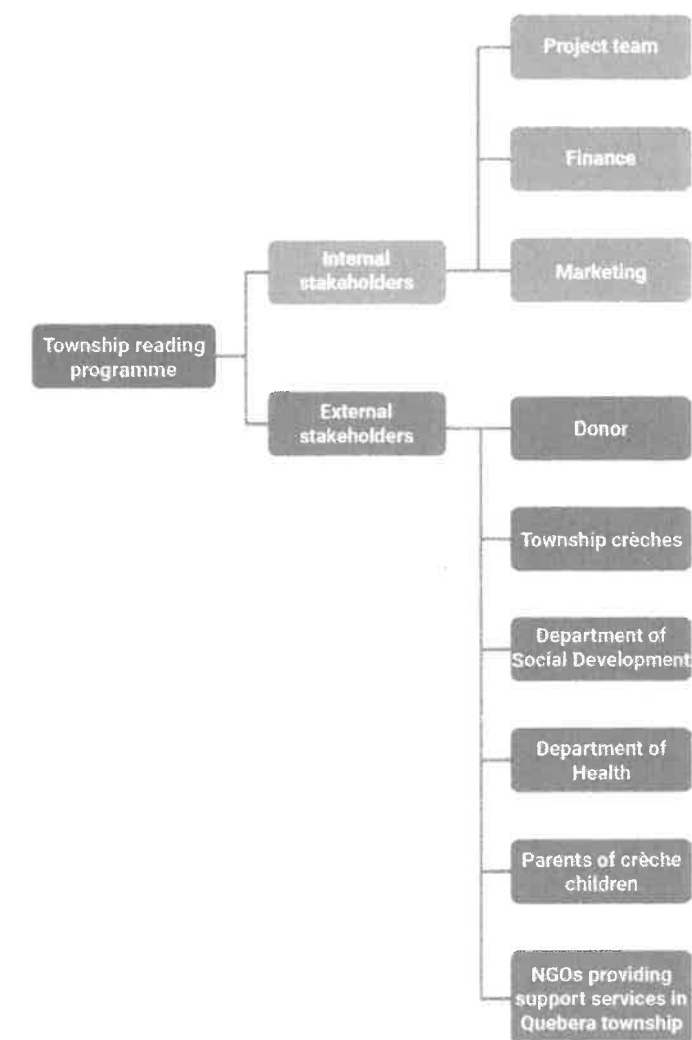
12.2.3 Case study: Stakeholder map

A stakeholder map identifies all the internal and external stakeholders that play a role in the implementation of your project. It is important to map out your stakeholders in advance, so that you can anticipate and plan for the work you will need to do with them in order to achieve your project outcomes. Some projects have very few stakeholders, and others have many; very complex and large projects can have over 100 stakeholders.

You will use a stakeholder map when completing your risk and communication planning. Some of your stakeholders will affect your risk planning and others will not. Some stakeholders will require regular communication and others will not. A stakeholder map helps you get a sense of the impact that stakeholders will have on your project outcomes, and will allow you to include this in your planning and implementation.

We will continue with our township reading programme to demonstrate an example of a stakeholder map. Firstly, there are two main categories: internal and external stakeholders. Internal stakeholders are members of your organisation who need to be kept informed of your project's progress. These may include the finance department or senior managers, or the marketing department. External stakeholders are those people and agencies outside your organisation that play a role in achieving or influencing your project outcomes.

The following figure shows an example of a stakeholder map for the township reading programme.



(Source: EDGE Learning Media (Pty) Ltd, 2020)

Figure 12.2: Quebera township reading programme stakeholder map

Once we have completed the stakeholder map, it is much easier to identify which stakeholders are most important to the success of a project. You should refer back to your stakeholder map during your risk planning, and communication strategy and planning.



EXERCISE 12C

Draw a stakeholder map for Deborah's music app project. Your stakeholder map must include all internal and external stakeholders. You are free to choose the format of your stakeholder map; it may be presented as a table or diagram.

You can build your map using Draw.io, Google Docs or MS Word. When you have finished your assignment, upload it to your LMS profile. You can then view the solution online.

12.3 PROJECT PLANNING IN PRACTICE

In earlier units, we looked at project planning, which involves the following areas of project management:

- Project schedules
- Critical paths
- Gantt charts
- Project milestones
- Human resource planning
- Financial planning
- Procurement planning
- Stakeholder planning
- Risk planning
- Quality planning
- Communication planning
- Conducting a kick-off meeting

In this section, you will complete the following four project management documents:

1. Risk plan
2. Quality plan
3. Gantt chart
4. Kick-off meeting agenda

12.3.1 Case study: Risk planning

Risk planning involves the identification of possible risks that could prevent the project from achieving its desired outcomes and objectives, as well as the compilation of a comprehensive response strategy. Each possible risk is identified and reviewed for:

- the likelihood that it will occur;
- the impact that it will have on the project;
- preventative strategies, which reduce the likelihood of the risk occurring; and
- reactive responses, which reduce the impact the risk will have on the project.

The most common risks that affect projects include:

- running out of time;
- running out of money;
- not being able to secure the required resources; and
- not being able to secure the required stakeholders.

Before project implementation, you must review all possible risks and develop a risk management plan. It is unlikely that you will fully eliminate a risk, but you can reduce the impact it may have on your project through good planning. Risk planning ensures that your project team is aware of possible risks and understands the strategies needed to address these risks, should they occur. Creating a risk management plan before the project reaches execution will eliminate a great deal of stress and pressure from your team.

Let's take a look at a risk management plan for the township reading programme.

Possible risk	Likelihood	Impact	Proactive	Reactive
Crèches do not want to participate in the reading programme	Low	High	Start recruitment process early, to allow time to bring in new crèches, should desired numbers not be reached	Source new crèches in nearby areas, if necessary
No support from Department of Social Development (DSD)	High	Low	Engage with DSD as early as possible to allow for extra time to secure buy-in, and contact key decision-makers in the department	None – DSD endorsement is useful, but is not essential
Schedule delays	Medium	High	- Assign deadlines by week - Monitor progress weekly - Respond immediately to delays	Request an extension from client, if necessary
Budget shortfall	Medium	High	- Monitor expenses monthly - Respond immediately to over- or under-expenditure - Identify reasons for over- or under-expenditure and address these within a week	Communicate over- or under-expenditure with client, if necessary, and request reallocation of funds

Crèche staff do not attend the training for the programme	Medium	High	- Start recruitment process as early as possible to ensure that crèche management endorses the programme - Get signed commitment from each crèche manager - Liaise with crèche managers within 24 hours if staff do not attend the training	- Consider training at the crèches to ensure attendance as a last resort - If time permits and if necessary, source new crèches in nearby areas
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(Source: EDGE Learning Media (Pty) Ltd, 2020)

Table 12.3: Quebera township reading programme risk management plan

By listing the project risks in a table like this, it is possible to identify the most crucial risks and ensure extra steps are taken to monitor and manage these. Such a table also ensures that the project team knows what to expect and how to respond, thereby eliminating uncertainty, as well as potential leadership and management issues.

Case study

One of Deborah's other projects is an online tutoring platform for matriculants. Her client is a large corporation that seeks to assist young people to improve their matric results. The platform will be available for iOS and Android. It will be free to use, as the costs are paid for by the client. Matric learners will sign in using their Gmail credentials.

Once on the platform, students choose the subjects for which they need support. The platform assigns each learner to a group based on their subject choices. The subject group is then allocated to an online tutor, who will be available for questions daily, during set times. Learners can join as many subject groups as they would like.

The platform must be fully functional and ready for launch within eight months of its start date. From month eight to month 12, the project will focus on recruiting learners and tutors, and activating them on the platform. A target of 800 learners and 200 tutors has been established. The project will have an official public launch 12 months after its start date, once all the learners and tutors are active on the platform. The client wants a single risk management plan for the entire project, including learner and tutor recruitment.

? EXERCISE 12D

Develop a risk management plan for Deborah's matric tutoring platform. Your risk management plan must contain the following:

- A list of the major risks that might affect the project

- A rating for the likelihood of each risk occurring
- A rating for the potential impact each risk may have on the project
- A strategy for each risk
- A response for each risk

Remember to include risks involved in both learner and tutor recruitment. Include all other possible risks you can think of that might affect the project from its start date to its launch.

You can create your risk management plan in Microsoft Excel or Google Sheets. When you have finished your assignment, save it as a PDF and upload it to your LMS profile. You can then view the solution online.

12.3.2 Case study: Quality planning

Quality planning and risk management go hand in hand. Both processes ensure that your project achieves its required deliverables. Quality planning is part of a three-part process, which includes the following:

- Quality standards and criteria
- Quality assurance
- Quality control

A project quality plan aims to reduce or eliminate any waste, mistakes or defects in the project process and final deliverables. This is done by:

- describing the required quality standards and criteria for the project;
- mapping out how these quality standards will be assured (guaranteed); and
- mapping out how quality will be controlled during the different project stages.

People often get confused between quality assurance and quality control. A simple way to distinguish between these concepts is to remember the following:

- Quality standards:** These describe what you are looking at, in order to determine if any waste, mistakes and defects have occurred.
- Quality assurance:** This refers to processes and systems put in place before the work begins. These systems and processes aim to reduce any mistakes, waste and defects.
- Quality control:** This refers to the day-to-day checking and monitoring of quality assurance processes and systems, as well as responding to issues which cause waste, mistakes or defects (Project Management Institute [a], 2017: 132).

Using our example of a township reading programme, a simple outline of a quality plan could look as follows.

Quality standards	Quality assurance	Quality control
All programme content is free of spelling errors	All completed programme content is proofread before printing	- All proofread content is digitally signed by the proofreader - All programme content is sent for approval to the programme director before being sent to be printed - The programme director checks to see if the content has been proofread before signing off - The programme director signs off on a reading book only if the proofreader's digital signature is in the document

(Source: EDGE Learning Media (Pty) Ltd, 2020)

Table 12.4: Quebera township reading programme quality plan

These three steps ensure that no reading programme material is sent to printing without being proofread. The programme director acts as the quality controller by physically signing off each reading book before it is sent to print. The programme director's signature indicates that the content has been proofread.

Case study

Deborah has been approached by a client who owns a factory that makes apple juice. The client wants to automate his production process to save costs in the long run, and has asked Deborah's team to develop computer software that will use artificial intelligence (AI) to monitor and manage quality in the production process. By automating his quality assurance and controls processes, he will also improve the quality of the juice, as human error will be removed from the quality management process. In order to brief the software developers on what the requested program must do, Deborah must develop a quality management plan for the juice production process. The juice production process is as follows.

- 1 Apples are collected from farms
- 2 Apples are stored in receiving warehouse
- 3 Fruit selection process is performed
- 4 Approved fruit is sent to the juicing section
- 5 Fruit is crushed and juice is extracted
- 6 Extracted juice is sent to the bottling section
- 7 Bottled juice is packed in the packaging section
- 8 Packed juice is stored in the warehouse
- 9 Packed juice is distributed from warehouse to retailers

(Source: EDGE Learning Media (Pty) Ltd, 2020)

Figure 12.3: A production process for an apple juice factory



EXERCISE 12E

Develop a quality management plan for the provided case study, to guide the software developers on how the AI software should be programmed for each stage of production. Your quality management plan must include the following details for each step:

- Quality standards
- Quality assurance
- Quality control

Remember to think about things such as pesticide removal, temperature control, equipment hygiene, staff hygiene, equipment and factory cleaning, and any required legal health and safety standards.

You can create your quality management plan in Microsoft Word or Google Docs. When you have finished your assignment, save it as a PDF and upload it to your LMS profile. You can then view the solution online.

12.3.3 Case study: Gantt chart

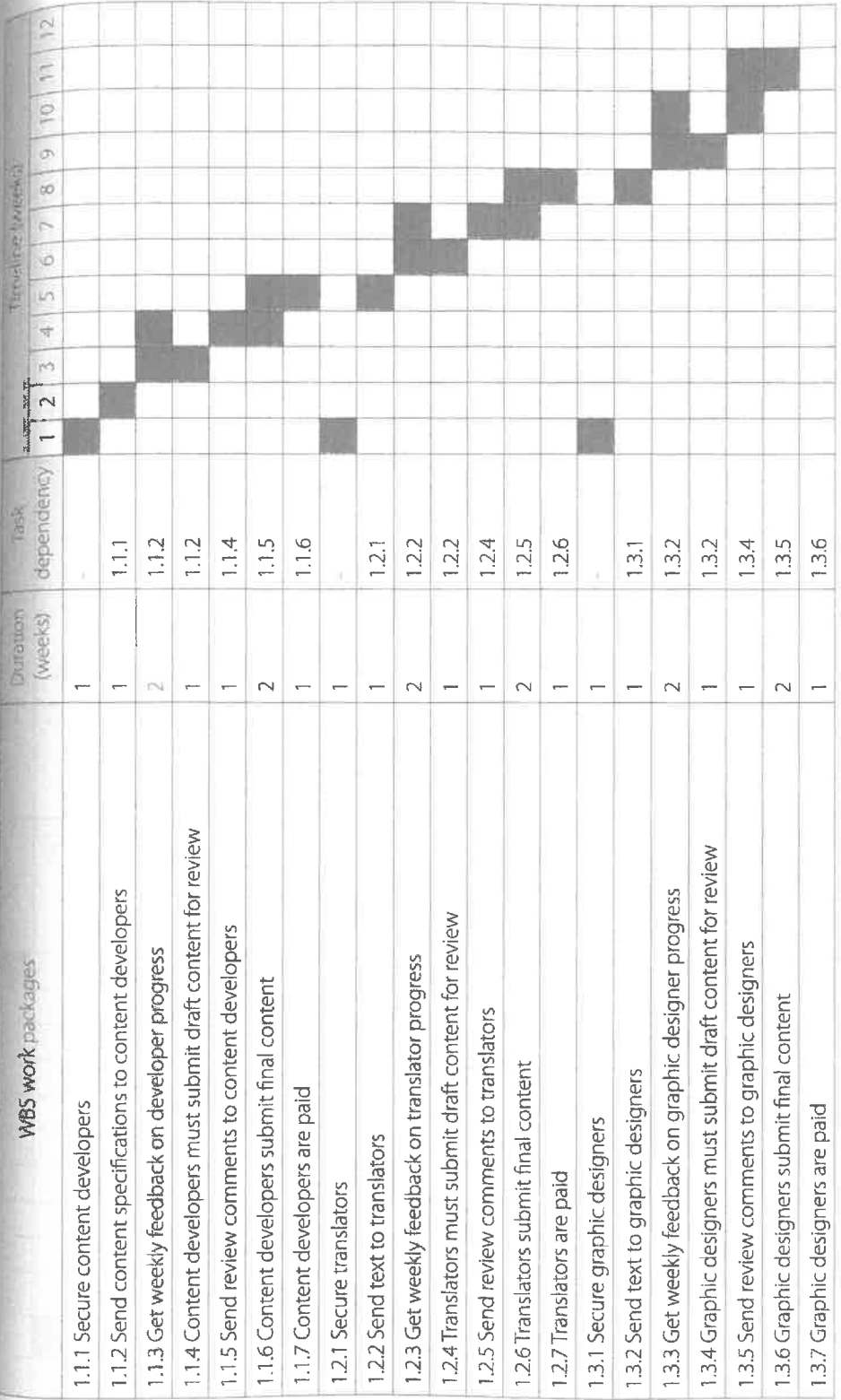
A Gantt chart is an illustration of your project's schedule in a bar graph format (Project Management Institute [b], 2017: 217). The Gantt chart contains a series of columns, which differ according to the nature of the project. The most common Gantt chart columns include the following:

- WBS number
- WBS task or activity
- Duration of task or activity
- Preceding task WBS number
- Person or department responsible
- Time frame depicting days, weeks or months

A Gantt chart depicts your WBS, based on time and the connections between tasks. This helps your team to understand when they must complete certain tasks, and which tasks depend on the completion of others. For example, in our township reading programme, we cannot set a date for the reading books to be printed before the proofreaders have completed their work. The printing date can only be set after proofreading and after the programme director's content approval is completed. A Gantt chart requires you to think about the order of tasks, and will allow you to schedule certain tasks to run at the same time.

It is important to remember that the Gantt chart is an incredibly useful and adaptive tool. You can add various columns to make the chart work best for your project. Experienced project managers play around with the Gantt chart format to suit the type of information they want it to include; no two Gantt charts look the same.

However, many Gantt chart software programs limit the degree to which you can adapt the tool to suit your purposes. You will probably find working in Google Sheets or MS Excel more creative and adaptive than a Gantt chart software program such as MS Project. You will also likely find that large project management businesses require the use of specific Gantt chart software for quality control purposes, and all their project Gantt charts have an identical structure. The following table is a Gantt chart that has been created for our township reading programme. We have taken the WBS tasks and mapped them along a timeline to provide an example of this tool. In this example, you can see that a number of tasks can be done at the same time, while others have to wait for preceding tasks to be completed.



EXERCISE 12F

Develop a Gantt chart for Deborah's music app using the WBS you developed in section 12.2.2. Select the headings that you feel are best suited to this type of project. You must have a column for WBS and at least two other columns in addition to the time frame column.

You can create your Gantt chart in Microsoft Excel or Google Sheets. When you have finished your assignment, save it as a PDF and upload it to your LMS profile. You can then view the solution online.

Bitrix24 is another program that can be used to draw project documentation, and it has a free version with limited capabilities. This program can be downloaded at the following link:

<https://www.bitrix24.com>

You will need to create a Bitrix24 account using your Gmail credentials, and then you can recreate your assignment Gantt chart using this software. This is an excellent opportunity to become familiar with project management software and develop your practical skills using project management tools.

12.3.4 Case study: Kick-off meeting

The internal kick-off meeting essentially marks the end of project planning and the start of project execution. It is a meeting with the entire project team, in which you orientate everyone to the project objectives, outcomes, time frames, schedules and project documents developed during the initiation stage. The external kick-off meeting is held with the client, where the client's end product and specifications are discussed and agreed upon.

It is important to note that the kick-off meeting is not the first time you will meet with your project team. You would have been engaging with them continually since project initiation, working to develop the project documents together. For this reason, many people skip the kick-off meeting because they feel that, by this stage, everybody knows what needs to happen. Do not make this mistake, as it can be a source of unnecessary confusion and wasted time.

Some project managers substitute a group kick-off meeting with multiple individual orientation meetings with different teams. This is another common mistake that must be avoided. There should only be one meeting, in which everybody is present. In real life, most of your project team will be working on several other projects, all of which can be at different stages. People can forget things or mix up projects; as such, it is crucial to bring your team together and review everything together before starting project execution. If your team is dispersed, you can include everyone via a video link. If new members join your team at a later stage, you must have a kick-off meeting with them individually so that they are fully orientated to the project. Clients are not normally present for internal kick-off meetings.

[illegible]

(Source: EDGE Learning Media (Pty) Ltd, 2020)

Table 12.5: Gantt chart for the Quebera township reading programme project

Using our township reading programme as an example, consider the following agenda for a kick-off meeting:

1. Attendees:

- Project director
- Project manager
- Project coordinator
- Reading programme field staff
- Finance
- Marketing

2. Agenda:

- Welcome
- Overview of kick-off meeting agenda
- Overview of reading programme:
 - Deliverables
 - Roles and responsibilities
 - Time frames
 - Budget
 - Programme schedules
 - Quality management process
 - Risk management process
 - Reporting requirements:
 - Internal statistics reporting: monthly due dates and format to be used
 - Client funding report due dates
- Weekly and monthly progress meeting schedules
- Questions
- Close meeting



EXERCISE 12G

Deborah has to prepare for the kick-off meeting for her music app project. The people who are invited to attend the meeting are the finance department, three software developers and one of the designers. She has to take her team through a review of the project deliverables and documentation. To make sure that she covers everything, she will need to establish a kick-off meeting agenda.

Develop a kick-off meeting agenda for Deborah's music project. Ensure that all project components are covered, even if they have not yet been covered in this unit. Refer to the content covered in units 1 to 11 to help you populate the meeting agenda. Make sure your agenda clearly reflects the requirements of Deborah's project.

The following article may be useful when thinking about what to put on the agenda (Aston, 2016):

<https://www.thedigitalprojectmanager.com/project-kickoff-meeting/>

You can create your kick-off meeting agenda using Microsoft Word or Google Docs. When you have finished your assignment, save it as a PDF and upload it to your LMS profile. You can then view the solution online.

12.4 PROJECT EXECUTION IN PRACTICE

So far, we have covered project initiation and planning, and we will now look at the processes involved in the execution of a project. The project execution stage involves the following:

- Scope management
- Schedule management
- Financial management
- Quality management
- Team management
- Risk management
- Stakeholder management
- Procurement management

In this section, you will complete practical activities to help you internalise the theory that you have learned in order to apply this to real-world situations. This section will focus on team management and scope management

You will produce two documents as practical demonstrations of your understanding of the theory learned to date. The documents will be based on two case studies provided in this section.

12.4.1 Case study: Team management

Team management involves planning and implementing activities that support and enhance the way your team functions as the project is implemented. Your team members are important project resources, and the overall success of your project depends on them. Having a team charter is a valuable way of ensuring that you invest sufficient time and energy into keeping the team focused, productive and motivated. There is no set format for a team charter. In general, team charters cover the following (Project Management Institute [b], 2017: 319):

- Communication guidelines
- Conflict resolution guidelines
- Team agreements and rules
- Guidelines for team meetings and check-ins
- Team behaviour expectations and standards
- Guidelines on assessing team performance

We may also ask a series of questions to determine the details of our team charter, such as the following:

- Who are the team members?
- How and where should the team communicate?
- How should the team raise challenges and concerns?
- How should the team deal with conflict?
- How should team meetings and check-ins be conducted?
- What are the standards to which all team members must agree?
- How will the team's performance be assessed, and how often?

The following table provides an example of a team charter for the Quebera township reading programme.

Team charter section	Details
Team roles	1. Project director: oversees the overall project and supports project coordinator 2. Project coordinator: implements the project according to schedule and scope, and supports the field team 3. Field team: implements the project according to schedule and scope 4. Finance: manages project finances and payments
Team behaviour expectations	1. All team members must fulfil their responsibilities and meet their deadlines, as set out in the project scope and schedule 2. All team members must contribute to the high functioning of the team, increase effectiveness, and reduce mistakes and delays 3. All team members should raise concerns, challenges and complaints with their line manager as soon as possible
Managing conflict	1. Any conflict must be discussed with the project coordinator as soon as possible, in order to be resolved as quickly and efficiently as possible, with minimal negative impact on the project and other team members 2. Any team member who is uncertain of how to respond to conflict must discuss this with their line manager for guidance
Team communication	1. All team communication and announcements will be made via the project WhatsApp group and email 2. All team members must check the WhatsApp group daily for updates 3. All team members must check their emails twice a day for updates

Team meetings and check-ins	1. All team members must attend their respective team meetings 2. If you are unable to attend a meeting, you must inform the meeting leader beforehand 3. All team members must come to meetings prepared and able to discuss the agenda, using the latest data and information that falls within their scope of responsibility
Assessing team performance	1. The team will meet every two months to assess its overall performance and adjust the team charter, if necessary

(Source: EDGE Learning Media (Pty) Ltd, 2020)

Table 12.6: Team charter for the Quebera township reading programme



EXERCISE 12H

Create a team charter for Deborah's music app project. The charter must provide guidance on all possible issues that could emerge with her team as they develop the app. Think about what kinds of issues might affect the music app development team, and provide basic guidance for how the team should manage each issue. The team should also receive guidance on any other areas you feel might affect them.

You can create your team charter using Microsoft Word or Google Docs. When you have finished your assignment, save it as a PDF and upload it to your LMS profile. You can then view the solution online.

12.4.2 Case study: Scope management

Scope management is about making sure your project stays on track, not just in terms of budget and deadlines, but in terms of activities and outputs. It is common for projects to have tasks and functions added after execution has begun, because as the project team moves away from viewing the project from a higher level, it gets embedded in day-to-day problem-solving and decision-making.

In order to ensure that your project meets its deliverables within budget and on time, it is essential to plan for scope management, or how you will manage potential scope creep during execution. Let's look at our township reading programme. The goal is to improve the reading skills of children at participating crèches. This is done by producing reading material and training crèche staff on how to use the material at their respective crèches. For this project, the team followed up with mentoring and aftercare, and assessed the impact of the reading programme through monitoring and evaluation tools. At this stage, things seem to be running smoothly.

However, when the project team actually got to project execution, they realised that the crèche staff are not comfortable with reading. None of these staff members have formal qualifications in

early childhood development, **nor** do they read at home, and **some** lack an appreciation of the importance of exposing young children to reading material.

This presents a very real problem, which could negatively impact the success of the project. The project team discusses whether they should first target the crèche staff's skills and knowledge before rolling out the reading material training. However, capacity development of the crèche staff on any topic other than reading is not part of the project scope. In retrospect, they realise that they should have assessed the crèche staff skills and knowledge, as well as their willingness to participate in the project, at a much earlier stage. However, the team does not have time to restart the crèche recruitment process.

Should the team adjust the project scope to include broader skills development for the crèche staff? If not, they may not reach their project outcomes. However, if they do, they run the risk of diluting the project resources in non-core areas. This is an example of scope creep.

The reality is that you can never plan for all possible issues that might occur. However, you can implement a general plan to discuss, manage and decide on unanticipated issues that may arise during execution and affect the achievement of project outcomes (Meredith et al., 2017: 258). This is a scope management plan. You should map out processes for your project to handle various issues, such as the following:

- Identifying new or unanticipated issues
- Analysing these issues and their potential impact on the project
- Analysing the costs of incorporating new activities or functions into the project
- Identifying possible alternatives that might be cheaper or quicker
- Setting up a process for formal approval and rejection of proposed scope changes
- Clearly communicating the new changes to all project team members
- Documenting this process for record-keeping in every instance of scope change

The client or donor must be involved in these processes, and their decisions and inputs should be recorded. You do not want a situation in which the client or donor says that they did not approve something, or questions additional costs, where incurred.



EXERCISE 12I

Develop a basic scope management plan for Deborah's music app that provides sufficiently detailed guidance for the project team to manage issues that arise during execution and may have an effect on the project outcomes.

Your scope management plan must describe the processes to be followed when:

- identifying a potential issue that affects project scope;
- analysing the potential issue;

- identifying possible alternatives;
- formal approval or rejection is necessary;
- decision documentation is required; and
- communicating the decision to the project team and client or donor.

You can create your scope management tool using Microsoft Word or Google Docs. When you have finished your assignment, save it as a PDF and upload it to your LMS profile. You can then view the solution online.

12.5 PROJECT MONITORING AND CONTROL IN PRACTICE

In part five of your project management course, you learned about the following:

- Scope monitoring and control
- Schedule monitoring and control
- Resource monitoring and control
- Financial monitoring and control
- Quality monitoring and control
- Communication monitoring and control
- Risk monitoring and control
- Stakeholder monitoring and control
- Procurement monitoring and control

In this section, you will be given the opportunity to develop documents in practical activities. This will help you to integrate the theory you have learned and to apply your knowledge. You will develop two documents relating to procurement and quality monitoring and control.

12.5.1 Case study: Procurement monitoring and control

Procurement monitoring and control focus on setting out systems and processes that specify how procurement takes place within your project. Depending on your project outcomes, you may find yourself having to procure:

- licensed software;
- specialised equipment;
- stationery;
- safety clothing and workwear;
- computers, printers and laptops;
- furniture;
- building supplies;
- vehicle hire or purchase;
- office space;

- a building or land; and
- hired services, such as cleaning, security and recycling.

In order to ensure that all required procurement is conducted efficiently and effectively, as well as within budget and on time, you need to have a procurement plan, and you must monitor and control that plan during project execution.

Procurement planning, monitoring and control seek to secure the required project equipment and external resources on time, within budget, according to set processes that have checks and balances, and at set quality standards. Quality is important, because it is not always a good idea to go with the cheapest product or service. You may end up paying more in repairs and maintenance than you would have paid for a higher-quality product. All equipment should be of a certain level of quality, as outlined by the South African Bureau of Standards (SABS), for example. Some products may be more expensive, but they include better warranties or service support contracts.

These are aspects to consider and plan for during the project planning stage, so that when procurement begins in project execution, it is efficient, cost-effective and undertaken according to set procedures. Procurement may also take place throughout your project, so ongoing monitoring and control is required.



EXERCISE 12J

We are going to move away from Deborah's software development projects for this section. Read the case study provided and answer the questions that follow.

You have been employed as the project manager for a five-year project funded by the United States Agency for International Development (USAID) that will establish and run food gardens in informal settlements. The overall goal of the project is to increase access to free, healthy and nutritious food for people living in informal settlements in designated areas. The project outcomes are measured by:

- square metres of vegetables planted;
- volume of food produced;
- volume of food distributed; and
- number of people receiving vegetables from the garden on a weekly basis.

There are five locations for the project. This means that five food gardens will each need:

- land to be rented;
- seeds;
- gardening equipment;
- fertiliser;
- secure storage sheds for equipment and seeds;
- secure fencing;
- irrigation systems;

- water storage tanks; and
- vegetable storage bins.

Required:

Develop a procurement plan with monitoring controls that suits this project. Your plan must provide clear guidance on the processes that each of the five sites must undertake to comply with the procurement plan. You also need to include clear monitoring controls for the procurement process. To guide you in this process, consider the following questions:

- How will you make sure that the procurement process has been followed?
- What processes need to be signed off and authorised before moving ahead?
- What documents need to be made available at the different stages?
- Which project team member is permitted to place orders?
- How will procurement decisions be made?
- Who has the authority to sign off on rental contracts?
- Must all suppliers be tax and VAT registered?
- How will you vet the credibility of potential suppliers?
- Can friends and relatives supply goods and services for the project?
- How will you eliminate corruption and fraud in the procurement process?

You can create your scope management tool using Microsoft Word or Google Docs. When you have finished your assignment, save it as a PDF and upload it to your LMS profile. You can then view the solution online.

12.5.2 Case study: Quality monitoring and control

Quality monitoring and control ensure that the project quality standards are appropriately monitored and controlled throughout the execution phase. A project quality management plan maps out quality standards, quality assurance processes, and quality control processes. This tells you what needs to be done during project execution, but how do you ensure it is actually being done? What if something needs to be changed?

Quality monitoring and control ensure the implementation of the project quality management plan during execution. At the same time, you need to assess the project quality management plan's accuracy and effectiveness. Once you are in the execution phase, you might find that the quality standards, quality assurance methods or quality controls do not get you the results you need. This means that you will have to make changes to achieve your project outcomes.

Just as changes to the project scope must be controlled and managed, changes to the project quality management plan have to be treated carefully (Meredith et al., 2017: 258). You cannot have people in the field making changes to the quality management plan as it occurs to them, nor can you prohibit changes altogether.

**EXERCISE 12K**

Refer to the juice factory quality management plan you developed in section 12.3.2.

Using the quality management plan you created for the juice factory, develop a set process by which changes may be made to:

- the quality standards;
- the quality assurance processes; and
- the quality control processes.

Think about who can propose quality changes, what processes need to be followed, what information is required to make an informed decision, who makes the final decision, and how the final approved changes are communicated to the team and the client.

You can create your scope management tool using Microsoft Word or Google Docs. When you have finished your assignment, save it as a PDF and upload it to your LMS profile. You can then view the solution online.

12.6 PROJECT CLOSURE IN PRACTICE

We are now at the final section of this unit. Here, we will explore examples of project closure activities. In the previous unit, you learned about project closure, where you covered:

- procurement closure;
- project acceptance;
- project review and performance reports;
- lessons learned;
- project handover;
- updating records; and
- resource release.

In this section, you will focus on project acceptance and project closure. You will then undertake two practical activities to showcase your understanding of the theory and your ability to apply it.

12.6.1 Case study: Project acceptance

The project acceptance tool ensures that the project has met its required deliverables and that the client or donor accepts the results. The project acceptance tool serves as a permanent record that all project outcomes have been met and have been confirmed by others.

During project acceptance, the project's outputs and outcomes are reviewed. This may include data or a functioning product, such as the music app. The outputs and outcomes are assessed

against the project specifications, scope statement, and quality management plan. This assessment is a final check to ensure that everything that was meant to be done has been completed within budget, according to requirements, and on time (Didinsky, 2017: 110).

**EXERCISE 12L**

We will use the juice factory software development project as a case study for this section. Read through the online sample of a project acceptance template using the following link:

<https://www.projectmanagementdocs.com/template/project-closure/project-acceptance/#axzz690E0zkR9>

Using the template as a base, develop your own project acceptance tool for the juice factory software project. You must adjust the template to suit the case study; add details from the juice factory case study that you consider important.

You can create your project acceptance tool using Microsoft Word or Google Docs. When you have finished your assignment, save it as a PDF and upload it to your LMS profile. You can then view the solution online.

12.6.2 Case study: Project closure

Project closure is the stage in which the project manager ends all project processes. Project closure can only begin once the client has signed the project acceptance form. Project closure is the final stage of the project life cycle, and comprises a range of activities, such as the following (Project Management Institute [b], 2017: 123):

- Product:
 - Hand over product to client, including passwords, account details, intellectual property, codes, and any other applicable element related to the complete handover of the end product
- Documentation:
 - Update all project tools and records
 - Ensure that all project documentation has been completed and archived
 - Review lessons learned and document these for use in future projects
 - Complete the final project report
 - Submit the final project report to the client
- Staff:
 - Release the project team for reallocation to other projects
 - End employment contracts of project staff employed for the project duration

- Contracts:
 - End all external service contracts required during project execution
- Finances:
 - Ensure that all costs have been accurately allocated
 - Ensure that all payments have been made
 - Close any external bank accounts created during project execution
 - Close any internal project accounts with the finance department
- Resources:
 - Release project resources for reallocation to other projects
 - Dispose of project resources that cannot be reallocated



EXERCISE 12M

Develop a generic, but comprehensive, project closure checklist applicable to any project; any project manager should be able to use your checklist to close their project. Ensure that you unpack the provided list into step-by-step details.

For example, instead of writing 'update all project records', list all the typical project records that should be checked and updated, such as quality management plans, risk management plans, risk registers, stakeholder management forms, scope statements and project schedules.

Your project closure checklist must reflect all the project tools and documents you have learned about in this course, as well as what needs to happen with these tools and documents during project closure.

You can create your project closure tool using Microsoft Word or Google Docs. When you have finished your assignment, save it as a PDF and upload it to your LMS profile. You can then view the solution online.

Experiment with different formats and layouts; use templates from the Internet and adapt them to your purposes. Review how effective they are, and change them if necessary. Develop your own toolkit of project management templates that you can use as a starting point for new projects. If a tool is not making your life easier, it needs to be reworked. Project management is not about being swamped with piles of documents that need to be managed in addition to the actual project for which you are responsible. The tools are intended to make project management a more efficient process.

At the same time, you need to accept that having proper plans and systems in place requires more work initially, but will save you from stress and will help to manage problems that may arise later. If you skip project planning, monitoring and control to save work, you will pay a heavy price during project execution.

12.7 SUMMARY

This unit has given you various opportunities to put the theory of project management into practice. You have developed a number of tools and documents that you will use when managing your own projects. The most important thing for you to take away from this unit is that the project management tools must work for you, and not the other way around. If you find yourself maintaining a tool or document purely for its own sake, without it adding actual value to your project, you may not be using the tool correctly. Adjust and adapt your tools so that they add value to your project and help achieve your project outcomes.

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Exercise solutions

As you work through your textbook and arrive at an exercise, attempt to answer it on your own. You can check your answer against the one provided in this section.

Unit 1	Project management within organisations
Unit 2	Strategy, project selection and feasibility
Unit 3	Project stakeholders and scope
Unit 4	The project schedule
Unit 5	Planning resources, finances, procurement and stakeholder engagement
Unit 6	Planning risk, quality and communication
Unit 7	Managing scope, schedules, costs and quality
Unit 8	Managing teams and project communication
Unit 9	Managing risks, stakeholders and procurement
Unit 10	Project monitoring and control
Unit 11	Project closure
Unit 12	Project management in practice

UNIT 1 PROJECT MANAGEMENT WITHIN ORGANISATIONS

EXERCISE 1A

- (i) The majority of the project's resources will be allocated *during* the execution phase.
- (ii)
- The International Organization for Standardization.
 - International standards foster trade by ensuring that all products meet the minimum safety and quality standards. Furthermore, having such standards makes production and manufacturing easier, as you do not need to reinvent the wheel each time you develop a product.

- (iii) Answers may vary. The following serves as a guide.

Consider the construction of a new skyscraper. Any changes to *the* plans, designs or materials *before* the project actually starts will be low in cost, since there is not yet any commitment to these plans. However, these are high-risk changes, as they may result in project delays or cancellations. Once a project has started, any changes are less risky, since the *people* are already committed. However, they would be more expensive since the *resources* are also already committed or, in some cases, have already been used.

EXERCISE 1B

- (i) Answers may vary. The following serve as examples:

- The 2016 Trump election campaign
- The 2016 Olympic Games
- The 2018 FIFA World Cup

- (ii) Answers may vary. The following serves as a guide.

- Jeff Bezos from Amazon.
- Bezos continues to lead his company and employees to new heights. Amazon is continually innovating and developing new products. As a result, their profits and

market share continue to rise, to the point that their products are found in almost any home and government.

- (iii) Answers may vary. The following serves as a guide.

- I recently *built* a laptop stand for myself.
- Yes.
- I planned the project properly, meaning that I knew *what* I was going to build, *how* I was going to build it, and *which* resources I was going to use.
 - I negotiated with suppliers to get the materials I required at a lower price.
 - I scheduled time for the project using a calendar application, and I used online forums to gain knowledge and insight regarding the project.

EXERCISE 1C

- (i) Answers may vary. The following serves as a guide.

I do not consider micromanaging to be a good management tactic. It erodes trust between the manager and staff, as the latter come to believe that they cannot do their jobs without their manager's oversight. Micromanagement also slows down project progress, since staff cannot operate independently without their manager's approval.

- (ii) Answers may vary. The following serves as a guide:

- A bad manager communicates poorly. This means that staff will not know what they should be doing, how they should be doing it, or why they are doing it.
- A bad manager micromanages staff. This destroys the trust between manager and staff, while slowing down project progress.
- A bad manager plans projects poorly. Not planning a project properly means that neither the manager nor the staff are fully aware of *what* needs to be done, as well as *when* and *how* this should be done. This will lead to project delays and exceeded budget.

- (iii) Your answers should resemble the following:

Manager	Leader
Instructs employees	a. Leads subordinates
b. Maintains the status quo	Challenges the status quo
Sees the short term	c. Plans for the long term
d. Micromanages employees	Trusts subordinates
Profit- and deadline-motivated	e. Innovation- and inspiration-motivated

F. Only invested in doing what is necessary	Visionary and forward thinking
Risk-averse	G. Risk-taker

EXERCISE 1D

- (i) Answers may vary. The following serves as an example.

A marketing plan is not listed in the table. If the project deliverable is a product or service, it must be sold to the public. For a deliverable to be sold, people need to be aware of it. The marketing plan is designed to market the deliverable to the public. In other words, the marketing plan will highlight *who* the product was created for, *how* the marketing will proceed (social media, print advertisement), as well as factors such as the budget or schedule for the marketing.

- (ii) Project staff often have a vested interest in the completion of a project. They will be paid for their work during the course of the project, and may also receive performance or early completion bonuses. Lastly, many staff might come to see the completion of a project as a personal or professional accomplishment.
- (iii) A debriefing session is used to highlight the successes and failures of a project. Managers and staff discuss areas with room for improvement, as well as areas they have optimised sufficiently. Changes in protocol are also discussed and documented during debriefings.

EXERCISE 1E

- (i) Standardising project documentation across an organisation has several benefits. Firstly, it cuts down on the amount of admin that comes with project documentation. If everyone uses the same document format and the same naming and numbering conventions, it is much easier to categorise and find documents. Secondly, it is easier for people who need to create documents to find the appropriate formats, requirements and document templates. Lastly, it makes it easier for people to read or review the documents, since they will not need to adjust to different formats, naming schemes, or content requirements to find the information they are looking for.
- (ii) Answers may vary. The following serves as a guide.
- Yes, I have used a note-taking application on my cell phone to write a to-do list. This has helped me to keep track of my tasks and cross them off as I complete them.
 - Examples of applications that are typically used are Slack, Dropbox, and Google Calendar.

- I use Slack regularly to communicate with project members, admin staff, and the project leader. Slack also has scheduling and file transfer functionality, making sharing and collaborative work easy.
- (iii) The PMO can act as a repository for project knowledge and documentation, as well as a regulatory body for the proper implementation of project standards. By reviewing current and past projects, the PMO is able to see how projects have performed, and by doing so, evaluate their use of standard practice and what they have achieved. This overview will allow the PMO to identify projects that produce the best results, as well as the methods that these projects have used. The PMO is able to determine the impact that particular practices have on each phase in the project life cycle, as well as the cost of change. It can also help the business to lessen the time that it takes to decide on a project, as the PMO can compare the proposal and charter of a project to previous projects in order to determine how likely it is that it will succeed. Lastly, the PMO can provide insight to project managers for future projects, warning them about risks or giving them early notice on opportunities that they can pursue.

PROJECT MANAGEMENT IN PRACTICE

- (i) A project management office (PMO) would have noticed the difference between imperial and metric measurements when putting together the plans, and would thus ensure that the British and French were aware that the measurements would need to be converted from inches to centimetres. Alternatively, the PMO may have performed the conversions itself and handed over the amended plans containing measurements in metric units.
- (ii)
- The majority of resources are assigned during the execution phase.
 - The risk to the project would be relatively low (as people had already committed to the project). However, the costs incurred would be high, as machines would need to be recalibrated, designs reworked, and staff retrained. Additionally, more materials would need to be requisitioned, since the previous materials were used for faulty designs.

UNIT 2 STRATEGY, PROJECT SELECTION AND FEASIBILITY

EXERCISE 2A

- (i) Answers may vary. The following serves as a guide.

	Objectives	Goals	Indicators	Initiatives
Financial dimension	Generate a profit of R 10 000 per month	Have at least ten regular clients	Balance sheet, customer investment	Acquire investment from key influencers
User experience	Provide users with the best content possible	Achieve maximum possible online engagement	Online metrics, comment sections, direct messages	Hold a competition where users can win prizes
Brand perspective	Gain visibility in the South African sphere	Become one of the top brands on social media networks	Customer interactions, polls, hashtags, keywords	Logo redesign and creation of short animated video intro
Market perspective	Be viewed as a leader in the industry	Gain at least 50 per cent market share by financial year end	Key metrics, customer surveys and interviews	Promote the brand using boosted posts

- (ii) Answers may vary. The following serves as a guide.

Projects	Programmes	Portfolios
- Smallest unit in the hierarchy - Projects vary in complexity and length - A portfolio encompasses all of the projects in a business	- It is the second-largest unit in the hierarchy - Consists of a number of similar projects	- A portfolio consists of all of the projects and programmes within an organisation - It is the largest unit in the hierarchy

- (iii) Project portfolio management (PPM) is a process that is used to bring the company's strategy in line with its activities. It entails evaluating and analysing an organisation's existing projects to determine their purpose, relevance and benefits in relation to the business' goals.

To execute this process, a project manager must:

- identify existing and potential projects;
- determine the impact projects have on strategic objectives;
- prioritise projects;
- allocate resources proportionally; and
- change project strategy where required.

EXERCISE 2B

- (i) Technical feasibility refers specifically to an organisation's existing ICT infrastructure as well as its available equipment and expertise. A technical feasibility report must cover these aspects to determine whether it is possible for a project to be initiated, given the organisation's existing technological capacity and expertise. Assessing technical feasibility may require that a project manager consults with one or more experts in order for an accurate conclusion to be drawn. While project managers may have some or even a great deal of technological knowledge, there is the possibility that they may require additional insights and input. Technical feasibility studies draw on the knowledge of a range of different individuals and consider the insights of specialists to establish a business's preparedness in terms of a project from a technical perspective.
- (ii) An executive summary should appear at the beginning of a feasibility study and should serve as a succinct description of the salient details of a given project. Executive summaries are structured so that they take up about five to ten per cent of the length of the study. An executive summary should be written in clear, understandable, formal language. It must be professional, to the point and honest, while also being comprehensive and well thought out. Upon reading the executive summary, stakeholders should know exactly what the feasibility study entails.

(iii)

Conduct preliminary analysis	Prepare a projected income statement	Conduct market research	Plan business operations	Prepare a balance sheet	Conduct review and analysis	Decide whether to proceed
Check to see what is already ongoing or available.	Prepare an income statement detailing what income it is believed that the project will make. Consider the initial investment as well as market conditions.	Conduct detailed research into the chosen market. An external business may need to be hired to carry out this research.	Determine project start-up costs. Source and contact suppliers; identify whether staff will require training.	Estimate your current assets and liabilities. Work with an accountant or a bookkeeper.	Revise research and verify findings. Have one or more persons double check the feasibility study.	Decide whether or not to carry on to the next phase. A decision not to go ahead may mean restarting the process.

EXERCISE 2C

(i) The six types of project proposals a project manager may encounter during the course of their work are as follows.

1. *Formally solicited:* These types of proposals are formally requested by someone in authority; for example, the chief executive officer (CEO). These types of projects are accompanied by a scope that outlines what the project needs to achieve, as well as other important details regarding budget, payment and schedules. A request for proposal (RFP) might also be included. It specifies client expectations and gives a project manager insight into what should be done to make their project proposal more accurate.
2. *Informally solicited:* Here, no RFP is issued, so important details regarding methodologies, objectives and timelines are not given any consideration. There is little to no initial direction given to a project manager and this makes the informally solicited feasibility study significantly more difficult to compile.

3. *Unsolicited:* An unsolicited proposal does not express the need or call for a project, so investors and stakeholders have no prior knowledge of the proposal or its contents. Convincing investors that they need to put money into a project they never even requested is a daunting task. This is why it is difficult to obtain investment for unsolicited project proposals.
4. *Continuation:* For active projects, a continuation proposal is compiled to justify the continuation of a given initiative. Continuation proposals are generally considered easy to compile, since they are mostly reminders or updates for stakeholders.
5. *Renewal:* In some cases, a project or initiative might be shut down or deferred. A renewal proposal is an attempt to convince investors to reinitiate the project by showing that the project's overall return on investment (ROI) will be worthwhile.
6. *Supplemental:* A project's existing resources may not be sufficient to achieve the best outcome. For this reason, supplemental proposals are put together in order to acquire additional resources to ensure that a project's ROI is even greater than was initially planned.

(ii) An evaluation plan is included in the appendices of a project proposal. The plan outlines exactly how the project manager plans to determine whether a project has achieved its objectives or not, and to what extent these objectives were realised. The project manager does not have to specify the exact methods they will use to evaluate the completed project, but they should indicate which aspects they will look at.

An evaluation plan should take both formative (process) assessment and summative (product) assessment into account. Formative assessment takes place as the project is being rolled out, while summative assessment takes place once the project has been completed. Both types of assessment must be factored into an evaluation. Monitoring and ongoing assessment must take place while the project is underway and a review should be carried out once the project is complete. An evaluation plan can make use of surveys, questionnaires, interviews, focus groups or financial analyses. The methods of review used will depend on the nature of the project as well as any applicable time or budgetary constraints.

(iii) Project proposals must not be emailed or posted because they contain valuable information and research that can be stolen by competitors. Project proposals should always be presented rather than handed over to investors. This allows investors to ask questions and gain greater appreciation for the project manager and their efforts. In many respects, the written component of a project proposal is merely a supporting document, while the actual proposal comes in the form of a presentation by the project manager. Only clients who are willing to give an answer about their involvement or that have already paid for your services should see the presentation.

UNIT 3 PROJECT STAKEHOLDERS AND SCOPE

EXERCISE 3A

- (i) Stakeholder recognition has seen three major movements over time. *Traditional project management* limits the horizon of stakeholder identification to the internal members who will be directly affected by the project work. Examples of these stakeholders include the project team, the project sponsor, the organisation and the customer. The traditional project management model considers the use of the resources and the project life cycle only as they relate to the internal stakeholders. *Modern project management* extends the horizon to all stakeholders, but there are still some limits to the definition of this category. These stakeholders include external parties such as suppliers, the immediate community, competitors and the industry in which the company operates. This horizon also considers some of the deliverable life cycle, and some of the effects/benefits life cycle once the project is complete.

The largest horizon is provided by *sustainable project management*, which also considers the local and global societies that will be affected by the project and its processes. Examples of these stakeholders could be other nations, natural spaces such as oceans and resource deposits, and international relations. This horizon covers all possible stakeholders that could be affected in the resource life cycle, the project life cycle, the deliverable life cycle, as well as the effects/benefits life cycle.

(ii)

Stakeholder salience positions			
a.	Dominant	6.	A stakeholder who has both power and legitimacy to make changes, but does not demand urgent changes.
b.	Discretionary	7.	A legitimate stakeholder who has no direct means to change project work, and no urgent demands.
c.	Dangerous	1.	A stakeholder who is a risk to the project as they can ask for large, sudden changes to the project work.
d.	Core	5.	A stakeholder who exhibits balance of power, legitimacy and urgency.
e.	Dormant	2.	A stakeholder who has the power to make large changes, but does not often have the motivation to use their power.
f.	Demanding	4.	A stakeholder who wants their needs tended to fast, but does not have the power or legitimacy to enforce this.

g.	Dependant	3.	A stakeholder who relies on you to make decisions as they do not have the power to do so themselves.
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- (iii) The power-interest grid looks at only two variables as they relate to a stakeholder. It looks at *power*, which is the ability to demand or make changes to the project processes or work, and *interest*, which is how much they will be affected by the project process or work. This is useful to use when the project is relatively straightforward and has few stakeholders, or when a cursory stakeholder analysis needs to be made at short notice. It is limited because it does not consider any other elements that might indicate how soon they may want to have their needs tended to, or whether they have the authority to make demands.

The salience model, on the other hand, covers three characteristics as well as the intersections between these characteristics. This means that we have seven possible positions that we can use to describe the relationship of the stakeholder to the project, but it takes longer to do this. The three characteristics are legitimacy, power and urgency. While power has the same definition in this model, *legitimacy* is the characteristic that describes the authority that the stakeholder has as a result of their position. For example, a request made by an executive manager is more legitimate than a request made by a project team member because their status in the business is quantifiably different. *Urgency* is the characteristic which describes how quickly the stakeholder will want you to act on their needs or demands. The mixture of these three qualities will allow us to describe the position of the stakeholder more accurately. The salience model would be more useful if we have many stakeholders with different needs, and the charter requires a more detailed explanation of how we plan to deal with them.

EXERCISE 3B

- (i) Answers may vary. The following serves as a guide.

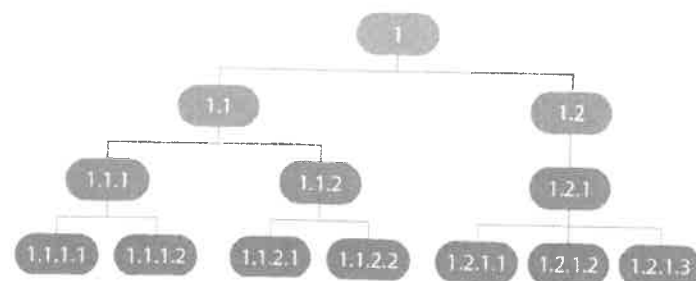
Objectives are the goals that the project seeks to achieve during the life cycle, but they do not always relate to particular work packages or deliverables that will be handed over to the customer. For example, the project might have the objective that all products should be delivered without any defects. *Specifications* are the particular characteristics that the project work must achieve in order to be considered ready for delivery. For example, if we are creating a product like a water bottle, there might be a specification that the bottle must be able to carry 750 ml of water. If the water bottle can only carry 740 ml, it has not met the specifications. However, if we manage to achieve the specifications for each product, we will also achieve the goal that no products would have a defect in this regard – though there may be other defects unrelated to the volume of the bottle. Objectives may be met by the achievement of the deliverable specifications, but we must understand that they serve different purposes in the charter and are measured according to different metrics.

- (ii)
- False. Success criteria are applicable to the stakeholders who set them, such as the project customers.
 - True
 - False. The project charter does not take the same form in every industry or in every business.
- (iii) Identifying the stakeholders of your project early in the initiation process is beneficial because you can determine if they have information that can help you plan the project. Involving stakeholders in the process can also help to engage with them and change their position if it is required.

EXERCISE 3C

- (i) To develop a WBS on a deliverable basis would mean that we continue to decompose the tasks in the diagram until we have sufficiently covered the level of detail required to achieve the deliverables of the project. For example, if the project must deliver three products, the WBS must draw out a task for each product to an acceptable level of detail – i.e. to the point where it could be delivered to the client.
- (ii) Task dependence refers to the relationship that a task has to the tasks that have come before it. When a task is dependent on another, it means that the earlier task must be completed before the current task can begin. For example, consider the process of making a simple item such as bread. In order to make bread, you would need to first grow wheat, then harvest it, process it in a mill, combine it with other ingredients, and then bake it. You would not be able to skip one of these steps (such as milling the wheat), or perform them out of order, if you wanted to get the intended result.

(iii)



(Source: EDGE Learning Media (Pty) Ltd, 2020)

Figure 3.1: Organisational WBS adapted from an outline

EXERCISE 3D

- (i) You may argue either side of this question as long as you provide a good justification. The following answers are an example of each side of this argument.

No, this project does not need a higher level of detail in the project charter. There are likely to be several companies submitting proposals, and this means that a short and concise charter would stand out better. The charter is only intended to prove the capability of the project team and management to an acceptable degree that they are able to do the work. Being able to contain the details of the project charter within a limited number of pages can signal to the sponsor that the team is aware of the sensitive nature of time and cost constraints. A longer charter may give the sponsor the impression that the company would take too long during the planning phase to be feasible.

Yes, this project would benefit from a more detailed charter. There are likely to be several companies submitting proposals, and the more details included, the easier for the sponsor to decide between them. The large investment of the project sponsor means that they will be concerned about the project work, as they stand to lose a lot of money if the project fails. This means that the project manager should take extra care to convince the sponsor that the project will succeed, and this will require more documentation than is typically provided in a charter. The more detailed charter might show that the project manager will be meticulous and careful with the sponsor's investment.

- (ii) Each document in the charter will need to be updated, as the charter is an early planning document that will definitely change as the project work is described in more detail. Some examples of these documents include the project budget, the stakeholder register, the work breakdown structure, the project milestones, and the team register. These may simply need to be developed to add more detail, but in cases where the work changes entirely, they may need to be completely recreated.
- (iii) The scope of the project was determined by the project sponsor, as they set both the cost and time constraints on the project. The final constraint of resources is up to the business to manage. LifePharm are a specialised business, and the management of staff and acquisition of special materials, such as drug compounds, would be completely within their control.
- (iv) The concerns particularly related to the life cycle of the resources would lead us to consider where LifePharm source the compounds and materials they use in order to create the drug. We need to ask if there are there any toxic by-products from the manufacturing process that may damage the environment, and whether the people who are creating the resources are themselves ethical. For example, if the materials that are used to make the drug are sourced from protected areas, such as indigenous land, then proper compensation and legal rights for people living in this area would be essential to consider during this process.

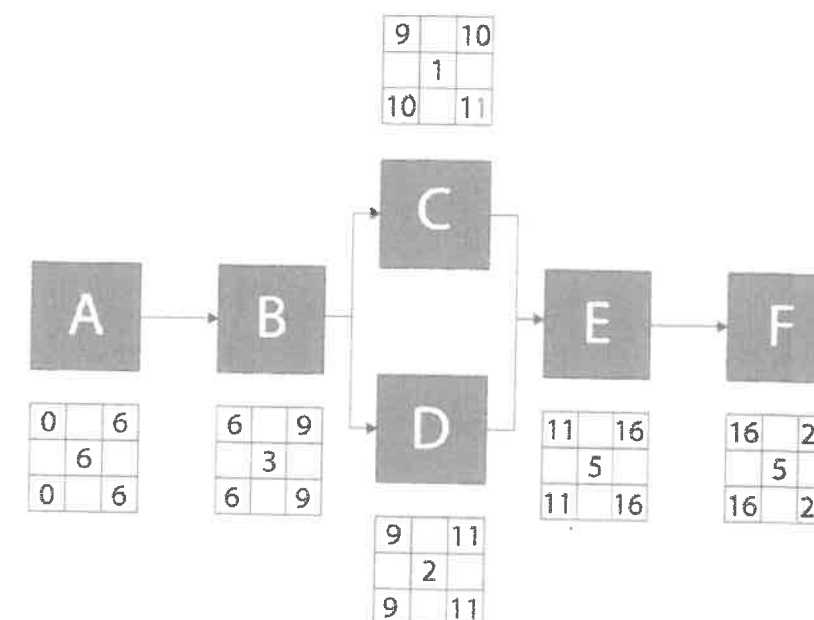
- (v) The concerns particularly related to the deliverable life cycle are two-fold. The first is about the use of the drug itself and the effects it would have on the user. The business would want to consider any harmful side effects from taking the drug that might damage the short- or long-term health of its users. We might even consider that the drug could be used recreationally, and how this may contribute to the substance abuse crisis. These are some of the considerations that you would make when considering the deliverable life cycle.

Another less obvious issue in the deliverable life cycle, which coincides with the effects/benefits life cycle, could be the price of the medication once it is available on the market. Pharmaceutical companies typically have a patent on the medications that they develop through research. This can make them the sole retailer of that medication (a monopsony), which can prevent the cost-effective manufacturing and distribution of the drug in the local market. It also places the pricing of the drug firmly in the hands of the company, and if they do not act ethically, they could end up adding extremely high profit margins onto the drug. The patent that the company secures for the drug also may not apply to generic international sales, which could lead to the drug becoming cheaper to purchase in other countries than the one in which it was developed, because they would have healthy competition from other manufacturers.

UNIT 4 THE PROJECT SCHEDULE

EXERCISE 4A

The following diagram presents the full CPM diagram, with both the forward and backward passes calculated.



(Source: EDGE Learning Media (Pty) Ltd, 2019)

Figure 4.1: Solution to calculating the project schedule for Exercise 4A

(i)

Activity A:

ES = 0 (because it is the first activity of the path)

EF = ES of A + Duration of activity

$$EF = 0 + 6$$

$$EF = 6 \text{ weeks}$$

Activity B:

$$ES = EF \text{ of previous activity}$$

$$ES = 6 \text{ weeks}$$

$$EF = ES \text{ of B} + \text{Duration of activity}$$

$$EF = 6 + 3$$

$$EF = 9 \text{ weeks}$$

Activity C:

$$ES = EF \text{ of previous activity}$$

$$ES = 9 \text{ weeks}$$

$$EF = ES \text{ of C} + \text{Duration of activity}$$

$$EF = 9 + 1$$

$$EF = 10 \text{ weeks}$$

Activity D:

$$ES = EF \text{ of previous activity}$$

$$ES = 9 \text{ weeks}$$

$$EF = ES \text{ of D} + \text{Duration of activity}$$

$$EF = 9 + 2$$

$$EF = 11 \text{ weeks}$$

Activity E:

$$ES = EF \text{ of previous activity}$$

$$ES = 11 \text{ weeks}$$

$$EF = ES \text{ of E} + \text{Duration of activity}$$

$$EF = 11 + 5$$

$$EF = 16 \text{ weeks}$$

Activity F:

$$ES = EF \text{ of previous activity}$$

$$ES = 16 \text{ weeks}$$

$$EF = ES \text{ of F} + \text{Duration of activity}$$

$$EF = 16 + 5$$

$$EF = 21 \text{ weeks}$$

Note that for activities A and B, on the critical path, the ES and EF dates are the same as the LS and LF dates. The LF of activity F will be 21, as it cannot go over the project completion date. Therefore, as established earlier, the project will take 21 weeks to complete.

- (ii) In order to complete the backward pass, you will begin with activity F, and then work your way backward in order to find the LS and LF dates of each activity in the project.

Activity F:

$$LS = LF \text{ of activity} - \text{Activity duration}$$

$$LS = 21 - 5$$

$$LS = 16 \text{ weeks}$$

Activity E:

$$LF = LS \text{ of successor activity}$$

$$LF = 16 \text{ weeks}$$

$$LS = LF \text{ of activity} - \text{Activity duration}$$

$$LS = 16 - 5$$

$$LS = 11 \text{ weeks}$$

Activity C:

$$LF = LS \text{ of successor activity}$$

$$LF = 11 \text{ weeks}$$

$$LS = LF \text{ of activity} - \text{Activity duration}$$

$$LS = 11 - 1$$

$$LS = 10 \text{ weeks}$$

Activity D:

$$LF = LS \text{ of successor activity}$$

$$LF = 11 \text{ weeks}$$

$$LS = LF \text{ of activity} - \text{Activity duration}$$

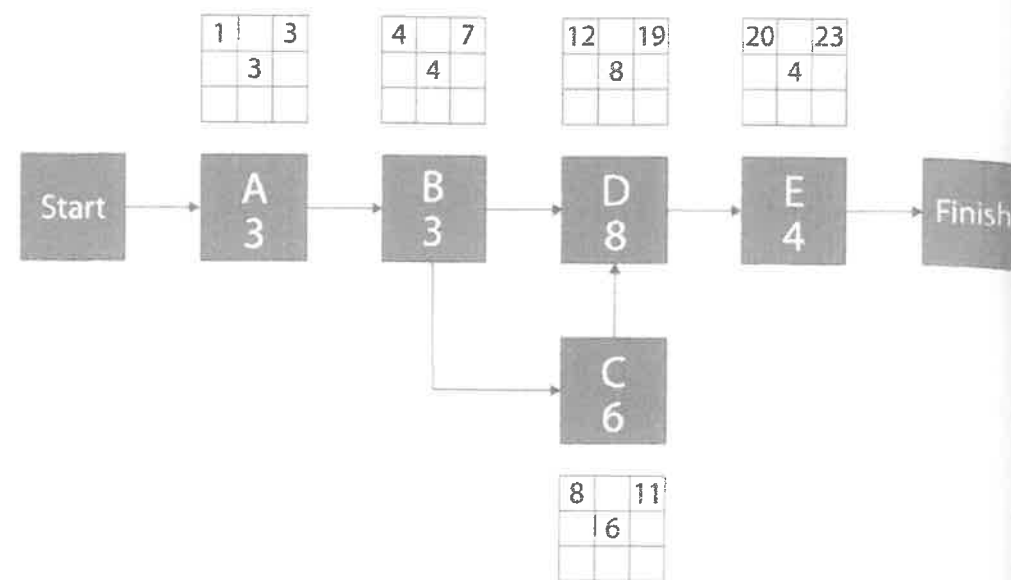
$$LS = 9 - 2$$

$$LS = 7 \text{ weeks}$$

- (iii) The critical path of the project is ABCEF.

EXERCISE 4B

The following diagram presents the full CPM diagram with both the forward and backward passes calculated. The backward pass, which you were not required to calculate, has been greyed out, but is included for the sake of completion.



(Source: EDGE Learning Media (Pty) Ltd, 2019)

Figure 4.2: Solution to calculating the project schedule for Exercise 4B

Activity A:

ES = 1 (because it is the first activity of the path)

EF = ES of A + Duration of activity - 1

EF = 1 + 3 - 1

EF = 3

Activity B:

ES = EF of previous activity + one

ES = 3 + 1

ES = 4

EF = ES of B + Duration of activity - 1

EF = 4 + 3 - 1

EF = 6

Activity C:

ES = EF of previous activity + 1

ES = 6 + 1

ES = 7

EF = ES of C + Duration of activity - 1

EF = 7 + 6 - 1

EF = 11

Activity D

ES = EF of previous activity + 1

ES = 11 + 1

ES = 12

EF = ES of D + Duration of activity - 1

EF = 12 + 8 - 1

EF = 19

Activity E

ES = EF of previous activity + 1

ES = 19 + 1

ES = 20

EF = ES of E + Duration of activity - 1

EF = 20 + 4 - 1

EF = 23

EXERCISE 4C

- (i) The purpose of creating a project baseline is to establish a limit to the project work. This is in line with the nature of a project as a contained, time-based piece of work, as it cannot continue indefinitely. A baseline also provides a way in which to test your project's performance, as the actual performance of project tasks, budget expenditure and other areas of the project will rarely match your planning. Your ability as a project manager should be demonstrated by having an actual project performance that closely resembles the planning that you have prepared.

(ii)

- True
- False. Schedule crashing refers to a method of schedule compression, which involves adding more project resources in order to reduce the duration of existing tasks.

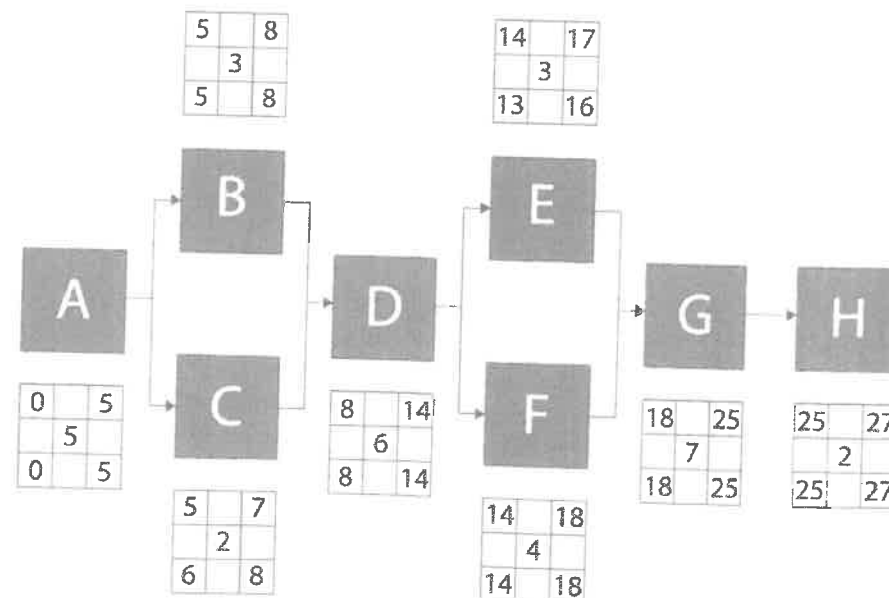
- c. False. Resource levelling makes the use of resources more rigid, levelling them at maximum efficiency. In this way, moving a resource that has already been levelled would cause disruptions in the project schedule.

(iii)

Column A		Column B	
a	Scope	3	The total amount of work that the project aims to achieve.
b	Budget	4	The allocation of project funds to each project task.
c	Schedule	5	The particular order and timing of the tasks that need to be completed within the project.
d	Quality	2	The level of accuracy or acceptability of the project work according to the triple constraint.
e	Baseline	1	The original plan that is developed for a project, against which actual performance is measured.

EXERCISE 4D

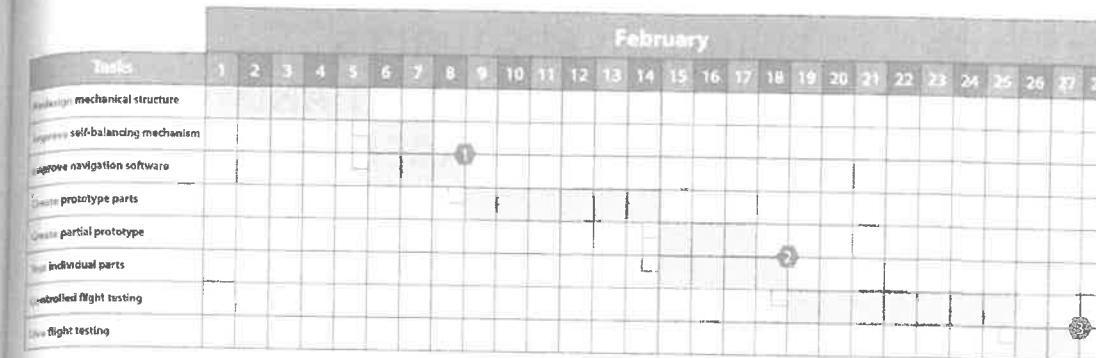
- (i) The following diagram indicates the complete forward and backward passes of the project schedule. The critical path of this project is ACDEGH.



(Source: EDGE Learning Media (Pty) Ltd, 2020)

Figure 4.3: Solution to calculating the project schedule for Exercise 4dD

- (ii) Your Gantt chart should look similar to the following diagram.



(Source: EDGE Learning Media (Pty) Ltd, 2020)

Figure 4.4: Gantt chart Exercise 4D solution

- (iii) The following budget can be developed by calculating the cost of each resource.

Resource	Cost	Quantity	Total
Mechanical engineer	R 450	14	R 6 300
Electrical engineer	R 450	10	R 4 500
Software developer	R 500	18	R 9 000
Frame	R 225	17	R 3 825
Electrical components	R 300	14	R 4 200
Software	R 750	14	R 10 500
Grand total			R 38 325

The baseline budget for this project is therefore R 38 325.

UNIT 5 PLANNING RESOURCES, FINANCES, PROCUREMENT AND STAKEHOLDER ENGAGEMENT

EXERCISE 5A

- (i) Answers may vary. The following serves as a guide.

The first input is project documents, which are required for resource estimation. They are used to determine which resources are required for each activity, when they are needed, how much money can be spent on them and the risks they may pose. They include documents such as activity lists, risk forecasts, budget documents and schedules. Organisational assets are the second input, and these are assets and processes that exist in the organisation. These include access to intellectual property, capital and technology, as well as various policies, best practice guides and standard operational procedures. There are a few factors that further affect the type of resource you are able to procure, including storage, purchasing and transport. The third input is business environment factors, which can impact resource estimation. These factors may exist in the immediate business environment and include the availability of a particular resource, where it can be procured from, whether the resource fits in with the organisational culture, which skills are available to work with the resource and whether the market permits purchase or sale of the resource.

- (ii) Estimate = $(O + 4ML + P) \div 6$
 $= (R\ 6\ 000 + 4[R\ 9\ 000] + R\ 18\ 000) \div 6$
 $= (R\ 6\ 000 + R\ 36\ 000 + R\ 18\ 000) \div 6$
 $= R\ 60\ 000 \div 6$
 $= R\ 10\ 000$

- (iii) As goals change in an organisation or project, KPIs need to be coordinated with these changes. This is to avoid evaluating the incorrect performance indicators, which could lead to incorrect assessments of progress. The combination of KPIs remains unique for each goal. For example, the KPIs used for assessment of reducing waste would be different to those used for the assessment of sales increases. KPIs are always aligned with the strategy of the project and organisation.

EXERCISE 5B

- (i) Padding is when a project manager (or other relevant stakeholder) takes it upon themselves to deliberately overestimate costs or inflate the budget of a project or task.

It is considered unethical as it means that the stakeholder or manager is lying to the team members and other stakeholders, and it could be used as a method of embezzling funds. Padding may be prevented by having project documents that are as accurate as possible, clear lines of communication with stakeholders and team members, and being transparent throughout the project.

Padding may also refer to the completely acceptable practice of increasing estimates in order to compensate for unexpected cost overruns. Padding, in this sense, must still be transparent and clear to all parties and add more information to estimates.

- (ii)
- a. The project is overbudget
 - b. The project is ahead of schedule
 - c. The project is exactly on schedule
- (iii) Fixed-price contracts specify a pre-determined and agreed-upon price for the procurement of goods and services. The project manager is responsible for managing the costs, because regardless of the project's success or profitability, the price of goods and services remains the same. Contracts can include rewards for performance, such as if a stakeholder delivers ahead of schedule or beyond the scope given. In long-term contracts, rewards may be considered if price projections compensate for rises in inflation, exchange rates and price fluctuation. This scope of fixed-price contracts must be precise and have accurate estimates.

Cost-reimbursable contracts, on the other hand, are used when project scope or estimates are less certain. This type of contract only pays for work performed and it requires detailed, timely documentation in order to avoid running overbudget (since costs can fluctuate quickly). Like fixed-price contracts, cost-reimbursable contracts can also include performance bonuses and other incentives.

EXERCISE 5C

- (i) True; employees draw a salary from the project and may receive incentives or completion awards. They are very invested in whether the project runs smoothly.
- (ii) Stakeholders may have special influence or knowledge that you do not have, which gives them a different perspective in resolving certain issues on the project. For example, stakeholders who have influence in local government could be able to assist with legal or compliance procedures. Similarly, a stakeholder with international contacts could facilitate the delivery of certain goods and services at a lower cost. Stakeholders can also act as human resource officers who are able to resolve conflicts internally, such as among team members. An advantage of involving stakeholders from the beginning of the project is that it helps to keep them informed on various successes and obstacles of

the project. Their involvement allows them to advise and mediate where necessary. An uninvolved stakeholder, however, will not have the required knowledge and context if they are asked to resolve a particular issue, and may even harm the project.

- (iii) You, your stakeholders and your team members must all understand the scope of the project. This will allow your stakeholders to know what to expect from the project, and will also narrow the focus of your team to assure that they remain on schedule and on budget. Understanding the project requirements means that you and your team are spared frustrations, time and money, as you will need to do the work only once to do it properly. This relies on open and constant communication between the project manager and the stakeholders.

PROJECT MANAGEMENT IN PRACTICE

- (i) Answers may vary. The following serves as a guide.

Name	Organisation	Category	Role
Moremogolo	MoNq Gaming	Co-owner and developer	Steer the company and assist with software development
Nqobile	MoNq Gaming	Co-owner and developer	Steer the company and assist with software development
Morgan	FixyPhones	Investor and landlord	Provide funds and manage infrastructure, as well as provide business knowledge
Piet Lategan	Standard Bank	Investor and bank liaison	Provide funding, business knowledge and manage contracts and regulatory requirements
Developer 1	MoNq Gaming	Employee	Assist with software development
Developer 2	MoNq Gaming	Employee	Assist with software development
Artist	MoNq Gaming	Employee	Develop art for the game
Musician	MoNq Gaming	Employee	Compose music for the game
Office administrator	MoNq Gaming	Employee	Manage the office, support the other employees and provide front-desk and administrative services

- (ii)

Term	Equation	Value
EV	(given)	R 2 050 100
PV	(given)	R 1 800 000
AC	(given)	R 1 900 000

BAC	(The original R 3 million minus the contingency funds)	R 2 750 000
CPI	$EV \div AC$	1.079
SPI	$EV \div PV$	1.139
SV	$EV - PV$	R 250 100
CV	$EV - AC$	R 150 000
ETC	$(BAC - EV) \div CPI$	R 648 656
EAC	$AC + ETC$	R 2 548 656

- (iii)

- MoNq Gaming is currently ahead of schedule. Their SPI (schedule performance index) is greater than one. Similarly, their SV (schedule variance) is positive. Both of these indicate that the actual performance of the project is greater than the planned performance.
- MoNq Gaming is currently operating under budget. Their cost performance index (CPI) is greater than one and their cost variance is positive. This indicates that the actual cost of the project so far is less than the planned cost of the project.

- (iv) Answers may vary. The following serves as a guide.

MoNq Gaming's first step should be to have a team meeting. Here, they will need to update the relevant project documents, namely scope, baseline, budget, schedule etc. Thereafter, they should meet with their stakeholders, such as Piet and Morgan. This will initiate a series of negotiations where MoNq can put forth their business case and all relevant documents, while Piet and Morgan review the documents and consider the feasibility of the expanded project. During this phase, MoNq might need to compromise on fractions of their scope or requirements in order to satisfy Piet and Morgan's requirements and stipulations for funding. MoNq will then update the project documents with the new scope, schedule, estimates etc. After this, they will meet with Piet and Morgan again to iron out any final details. Once Piet and Morgan approve another round of funding, MoNq may begin their work on phase two of the project.

UNIT 6 PLANNING RISK, QUALITY AND COMMUNICATION

EXERCISE 6A

- (i) Forest fire risk could be avoided by selecting a different piece of land where there is no risk of forest fires, or by halting the expansion project until a solution is found to prevent the risk of forest fires. The risk of forest fires could be mitigated by installing fire breaks around the premises. The risk could also be wholly/partially transferred by purchasing fire insurance to cover losses in the event of forest fires. Finally, the nursery could simply accept the risk of fire, and focus on other risks and **direct their** resources elsewhere.
- (ii) Creating a risk management plan requires the **following** steps:
- Establishing a core objective
 - Assigning responsibilities
 - Identifying lack of technical knowledge/expertise in **any** areas
 - Describing a risk assessment protocol
 - Formulating a risk rating system
 - Developing risk response and monitoring strategies
 - Creating protocols for reporting, documentation and communication
- (iii) Based on the risk register, the risk labelled ID 2 should be prioritised, as **it** could potentially force the organisation **into** closure.

ID	Date identified	Description	Trigger	Probability	Impact	Threat	Owner	Mitigation	Contingency	Progress status	Status
1	9 February 2019	Loss of company vehicles	Theft or collision of a vehicle	Orange	Yellow	Orange	Ms K. N. Carolissen	Ensure that the company has at least one spare vehicle available	Involve the South African Police Service (SAPS) Ensure the driver is healthy Hire alternative vehicles in the interim Repair, recover or procure a new vehicle	8 November 2019: Hijacking occurred while en-route to warehouse. 10 November 2019: Contingencies activated, driver is safe.	Open
2	11 December 2008	Leakage of manufacturing effluent into the Vaal River	Above-normal readings on manufacturing by-products in the water	Orange	Red	Red	Dr P. P. Maloyi	Cease manufacturing until the leak is found and investigate cause of leak	Notify local stakeholder Ask for assistance from the local municipalities and/or national government Conduct internal audits of all processes and equipment Prepare for possible litigation Conduct wide-scale clean-up operations	13 February 2020: Toxic levels of sodium azide discovered in local drinking water. 15 February 2020: Source traced to our manufacturing plant. Plant shut down pending investigation. 23 February 2020: Leak found in underground pipeline.	Open

EXERCISE 6B

(i) Quality has been met if the project deliverable adheres to the scope and requirements of the project plan, and if it meets the client's requirements and specifications. Further, quality deliverables also need to adhere to all organisational policies, as well as laws and regulations.

(ii)

- Scatter plot or trend analysis
- Pareto chart
- Normal distribution or bell curve

(iii) Answers may vary. The following serves as a guide.

Firstly, the project or facility manager may not have communicated the sampling and testing schedules/plans to the relevant teams, or the teams were not able to sample and test properly for one or more reasons. Secondly, the manager may not have set appropriate, informed quality limits. This could have meant that, although the defective products were 'caught', they still entered the market since the quality threshold was set too low. Thirdly the manager may not have performed appropriate data analysis on the information they were given. This could have meant that they did not receive the appropriate insights into the trends and variances in the products and processes of the facility. Consequently, they would have been unable to make an informed decision regarding the defective product.

EXERCISE 6C

(i) Answers may vary. The following serves as a guide.

Functional requirements:

- The product is non-toxic
- The product relaxes and conditions hair
- The product reduces dandruff
- The container does not leak
- The volume of each container is 300 ml

Non-functional requirements:

- The product has an attractive scent
- The packaging is eye-catching
- The product name is appealing

(ii)

- The project manager first needs to identify who needs the information.
- Then, the project manager needs to decide what information these different people need.
- Then, they schedule the delivery of that information – in other words, they decide when the information must be delivered and to whom.
- Lastly, the project manager decides how and with which tools they will deliver the information – in other words, they choose the medium and tools for communication.

(iii)

- $n = 12$ (11 team members and one leader)
 $N = (n \times (n - 1)) \div 2$
 $N = (12 \times 11) \div 2 = 66$
 Therefore, there are 66 communication channels.

- Answers may vary. The following serves as a guide.

An electronic service, such as email or instant messaging, would be the most appropriate method. The best tool might be an email client, such as Gmail, or a messaging app, such as Slack.

(iv)

False. While it is important to communicate (and stress) the team's goals and objectives, the leader should also discuss the project/organisational goals and objectives. This provides helpful context for the team and shows them how they 'fit into the big picture'. It also allows them to adapt their protocols, processes, and deliverables, in a manner that is compliant with organisational strategies, protocols and requirements.

EXERCISE 6D

(i) Answers may vary. The following serves as a guide.

- Wasted budget:* Project sponsors can see their invested resources squandered due to poor planning, resulting in additional expenses and poor resource allocation.
- Stakeholders do not know what to expect:* Poor planning will leave many stakeholders in the dark regarding project objectives, outcomes and progress, and project team expectations could differ from that of stakeholders if these aspects are not communicated clearly in the project plan.
- The project outcome is of no benefit:* Poor planning can lead to project deliverables not achieving the expected project outcomes if sufficient planning is not done in terms of project feasibility and benefit analysis.
- Project delays:* If project processes, schedules and timelines are poorly understood due to ineffective planning, then project delays will be inevitable. This will lead to results such as client dissatisfaction and lower profitability over the long term, as additional expenses accumulate and a less competitive project deliverable is offered.

(ii) Firstly, the pre-kick-off meeting is used to gather inputs from all relevant and experienced stakeholders on scope, estimates, rules and requirements of the project. These meetings happen two to three months ahead of the project execution phase. Secondly, after the pre-kick-off meeting, the 'core' project team meets again – usually within days – to ensure that everyone understands what the pre-kick-off meeting discussed. Thirdly, the resource review meeting is scheduled once each team has had some time to develop and refine their estimates, budgets and schedules. These meetings are used to ensure that there are no significant overlaps, omissions or faults in each team's plans. Lastly, the teams present their plans in a series of summary meetings to the relevant stakeholders or sponsors, in order to obtain final authorisation before the project execution phase.

- (iii)
1. The project plan is applicable to the entire project – i.e. it has been *scaled* properly to all tasks and estimates.
 2. The client and quality requirements are clearly defined and communicated to all stakeholders.
 3. The vendor and procurement strategies have been reviewed and authorised, initial contracts have been developed and statements of work have been sent out.
 4. The scope, baseline and requirements of the project have been clearly mapped out and communicated to all relevant stakeholders.
 5. The project manager has assessed the various risks to the project, and developed mitigation and contingency strategies for each possible risk.

PROJECT MANAGEMENT IN PRACTICE

Answers may vary. The following serves as a guide.

Risk planning

Expanding her business will expose Alice to more risks than before, which should be identified so that mitigation and contingency strategies can be planned. Some risks she should consider include the following:

- Exposure to competitors that already exist in these towns, and the resultant threat of being outcompeted.
- New distribution requirements mean that additional logistical considerations will be necessary to combat the distribution and delivery risks. She may need to hire additional drivers or hire third-party delivery services.
- With a larger pool of potential customers comes an increased demand for production of deliverables. The project processes behind the production of her pottery products will need to be scaled up, and this may require additional resources, re-evaluation of production processes and employment of additional staff.

A *risk register* is an important tool to document the collection of identified risks, and any supplementary information pertaining to each risk, such as a description of the risk, risk triggers, the probability of the risk occurring, the impact of the risk, a calculated risk score, who is responsible for the risk, and any mitigation or contingency strategies to implement in the event that the risk occurs.

Quality planning

New sales territories can be accompanied by new quality requirements. Whether these arise from local governments, legal or regulatory bodies, or customer preferences, the quality plan should involve the research necessary to answer questions regarding these requirements, and (where necessary) changes to project processes should be planned for implementation.

The ISO 9000 family of quality management systems is a set of standards that can assist Alice to ensure her products meet the expectations of her stakeholders within the statutory and regulatory requirements.

Communication planning

The expansion of Alice's business into new territories brings with it a new project environment, larger than that of her current environment, which means the addition of new stakeholders. Alice can ask the following five key questions: 'Who needs information?', 'What information is needed?', 'When is the information needed?', 'How will communication take place?' and 'How often should communication take place?'. These questions will help her identify all the stakeholders that should be considered in her communication plan, in order to produce an efficient communication strategy and ensure that the right information gets to the right people, at the right time.

To help Alice identify the most effective communication strategies for her stakeholders, she could consider making use of surveys, focus groups, personal interviews or field trials, which are methods where feedback is requested.

UNIT 7 MANAGING SCOPE, SCHEDULES, COSTS AND QUALITY

EXERCISE 7A

- (i) At the bare minimum, the process that ABC Company management should follow is as follows:
1. Assess the costs of introducing the new services to the existing business model in terms of the following:
 - New staff
 - New software
 - Changing existing business processes and systems
 - Training existing staff
 - Advertising the new services
 2. Assess the potential income benefits that could be expected from the new services
 3. Assess the existing competition that is offering the same service, and determine whether they will be able to offer a better service or a more cost-effective service in order to compete
 4. Conduct a small test to determine the demand for the service from the existing customer base
 5. If a decision is made to move ahead with the new services, do the following:
 - Inform all staff in a structured way
 - Train all staff on the new service, and employ new staff where necessary
 - Update the website and all business documentation and systems to reflect the new service
 - Set a review date to assess the new service's impact on the business
- (ii) a. Making the changes all at once:
- *Pros:* The benefits of making the changes all at once include making one set of changes to the business capacity, processes and documentation. This would be more cost-effective than going through waves of change over time.

- *Cons:* The cons of making the changes all at once include not being able to separate the impact of the different services clearly. If one new service is going well, and the other is not, it may not be easy to obtain clear data on what is working and why, as all the changes are being made at once. Conversely, if the new services do not work out, it would mean reversing all of the changes made to the business operations to date.

Making the changes one at a time:

- *Pros:* This is the safer route, as it allows for more controlled and careful implementation of changes to the business operations. Doing a small test, and then scaling up if the results are positive, is the more secure and stable approach when making changes to business operations.
- *Cons:* It can be the more costly approach, as business documentation and processes will need to be adjusted in waves.

- b. Answers may vary. The following serves as a guide.

Your answer should demonstrate the reasons why one approach would be preferable in your opinion. These decisions are often strongly influenced by our own individual tolerance for risk and uncertainty. The important learning point here is that you understand the different options available, and the pros and cons of each.

EXERCISE 7B

- (i) The project team may not be updating the project schedule for the following possible reasons:
- They are not structured and organised as professionals, and therefore put little effort into updating the schedule to reflect recent changes.
 - They do not understand the importance of having an accurate and up-to-date project schedule, or think it has little impact on their work and on the project as a whole.
 - There are no consequences for failing to maintain the project schedule.
 - They may not have adequate technical or digital skills, and so they avoid using the project schedule.
- (ii) Failure to maintain an accurate and up-to-date project schedule will eventually have the following impact:
- There is a very real risk of scope and schedule creep, as daily and weekly activities are not being monitored and controlled.

- It would be extremely challenging to project financial costs for the month ahead. This will have an impact on budget planning and financial management.
- It will become impossible to manage the project resources, such as printing, catering, and venue and vehicle bookings, as there is no central schedule. People may just arrive at a venue expecting to run their activity, and find another staff member is already using it. Catering and printing invoices may also be submitted late for payment.
- There is a very real danger that the project will not reach its required deliverables, because of scope, schedule and financial challenges caused by lack of schedule management.
- Staff performance will be difficult to assess regularly against planned activities.

(iii) The project manager would need to assess the possible factors contributing to this situation, and address each one individually. Staff may need to be trained in the necessary digital or technical skills to make them more comfortable with updating the online schedule. They may also need to be reoriented regarding the crucial importance of proper schedule management for their individual work, as well as for the project as a whole. It may also be necessary to put disciplinary measures in place for staff members who do not update the schedule.

EXERCISE 7C

- (i) Amanda meant well and wanted to do a nice thing for her staff, but she did not act correctly as a senior manager. She has a fixed budget, and knows what money is available for which activities. She was therefore aware that there is no budget line for project team rewards or bonuses. If she felt having a nice lunch was necessary for staff morale, she should have discussed it with the project manager, and a formal decision could have been made for the entire project staff.

By acting on her own, she misused funds for purposes for which the funds were not intended. This could result in her undergoing disciplinary action, and even being fired. Aside from the possible negative consequences for Amanda herself, she has caused problems for other people in the team. Now, the other managers look bad and staff are unhappy. The whole project team morale has now been negatively affected.

In the event that her site needs repairs and maintenance money later on in the year, she now has less money available, and may run into serious difficulties if she cannot repair crucial equipment and machinery.

- (ii) The other province managers acted correctly. Only the project manager can approve deviations from the approved budget, and only after following a structured process that assesses the possible impact of those deviations.

- (iii) If more province managers followed Amanda's example, the entire project would be jeopardised due to finances not being managed properly. Strict financial management is required to ensure that adequate resources are available for core activities needed to achieve the project deliverables. Changes may become necessary, but these changes must be discussed and assessed before making a final decision. Once a final decision has been made, the project team is informed.

EXERCISE 7D

- (i) Debbie has not acted correctly. She has made substantial changes to the programme content without the approval of the project manager. The changes will have a direct negative effect on the programme quality, as the programme in Durban is now different to the one used elsewhere. Her changes have not undergone a quality review, so we have no sense of the value and quality of her new content. The project's quality management system is also not designed for her programme structure. The impact on the learners attending Debbie's programme will be very different to the impact on the other pupils. Debbie's learners are also learning less theory and spending more time playing games. It is very likely that they will not have the same increase in knowledge as the other children.
- (ii) Debbie's actions could impact the entire project due to inconsistent programme content and quality. By not using the same content as the other staff, the impact data from Debbie's programmes will distort the data from the other programmes. The national data will not be valid and accurate, and this will result in inaccurate conclusions about the overall quality and impact of the Bright Bulb programme. Furthermore, the Durban schools assume they are getting the standard Bright Bulb programme that they agreed to pay for. If they discover that their learners are not receiving the same programme, they may demand a refund, and may refuse to continue using the Bright Bulb programme.
- (iii) If Debbie felt that the programme materials were too advanced, she should have discussed this with the project manager. The project manager would have then sought out more feedback from the children and the schools about their perspectives. If the feedback suggested that Debbie could be correct, the project manager could have agreed to quality review Debbie's materials and run a pilot test with them. Based on the results of this pilot, the project manager would then decide to not make any further use of Debbie's materials, to make changes to the standard programme material, or to have two versions of the programme material: one for age 14 to 16 and one for 17 and older. Either way, the project manager would have followed a structured process in managing any changes in order to minimise any negative consequences.

PROJECT MANAGEMENT IN PRACTICE

Answers may vary. The following serves as a guide.

You are required to unpack the value of good schedule, scope, financial and quality management as they apply to this case study. Your answers should point out the failures in these areas, and demonstrate that you fully understand the importance of managing project change in a structured way.

Scope management

This case study shows that the project has no clear scope statement, and that the ad hoc changes made during the life of the project were never documented. This means there is no shared, central vision of what needs to be done, and how it should be done. It also means it is impossible to extract any meaningful learning from this project and apply it to similar projects, or to expand the project.

The lack of scope management also negatively affects the other project components, such as quality, schedule and financial management.

Quality management

The project team cannot state with any certainty that their model works, because there was no consistent implementation of programme material. Without some form of a quality management plan, there is no concept of what works and what does not work. There is no clear outline of what was tried initially, what changes were made and what the end results were. There is also no reliable data with which to make comparisons and assessments. It is not possible to identify the most effective processes and materials. It will also not be possible to make any effective improvements without a clear understanding of what works best.

Financial management

It is unsurprising that the project ran into financial difficulties, as there was no attempt at financial management. Looking at project expenses is unhelpful, as it provides no indication of how well the project is doing, and whether the expenses were justified. It is not possible to tell if the same results could have been achieved with less money.

Schedule management

It is clear that the lack of schedule management has had a negative impact on the project. Poor schedule management directly impacts scope, quality and financial management. Informal checking of weekly tasks lists does not help to monitor project progress as a whole. Having a WBS and unpacking this into a more detailed Gantt chart is essential to having a good grasp of the project overall, and to accurately assess its progress on a daily and weekly basis.

Schedule management also allows for proper corrective action to be taken, should any activity fall behind schedule. If there are repeated schedule problems, this points to a systemic problem in the project, which needs immediate attention.

Overall project management

All of the project's problems can be traced back to the fact that there is no project manager – no single person responsible for keeping the project on track. Having one person responsible for ensuring everything is on track increases the likelihood of the project activities and components being synchronised and integrated. It is impossible for a team of people with varying levels of experience and knowledge, and different work styles, to organically pull a project together.

After one year of implementation, the pilot has not produced any results regarding what works and what does not work in the programme. Despite spending a significant amount of money, the project team has failed to meet most of the deliverables. They have no basis for advocating for more funds to expand the project in other areas.

Having set structures in place does not mean your project will not be innovative and creative. In fact, innovation and creativity are very structured processes. People who fail to understand what innovation and creativity are also fail to appreciate the structure and discipline required to produce innovative and creative results. People with very little grounding in innovative and creative processes assume that a lack of structure fosters innovation and creativity. This belief is extremely common, and you will encounter it frequently in your career.

You will also encounter scenarios when an organisation claims it does not have the time and resources to set up proper processes or implement them, and that they prefer to move straight into execution and deal with things on a day-to-day basis. The belief here is that time and resources will be saved by implementing the project right away, and that structured systems and processes waste more time than they save. This is even more common than the belief about chaos breeding creativity and innovation. It should be clear to you by now that this approach will result in the project spending far more time trying to fix problems and issues during implementation than it would have spent on proper planning and systems design in the first place.

The case study illustrates exactly how badly things can go when outcomes are chased without an adequate framework. Having adequate systems and processes in place may require more work in the beginning, but it will help you achieve better results. You do not need to have cumbersome and laboriously detailed management systems in place to run a good project, but there must be a shared consensus on what you are doing, why and how you are doing it, and how changes will be managed during execution. This basic structure will create a safe space to innovate and create without undermining the overall objectives of the project, or wasting resources, time and money.

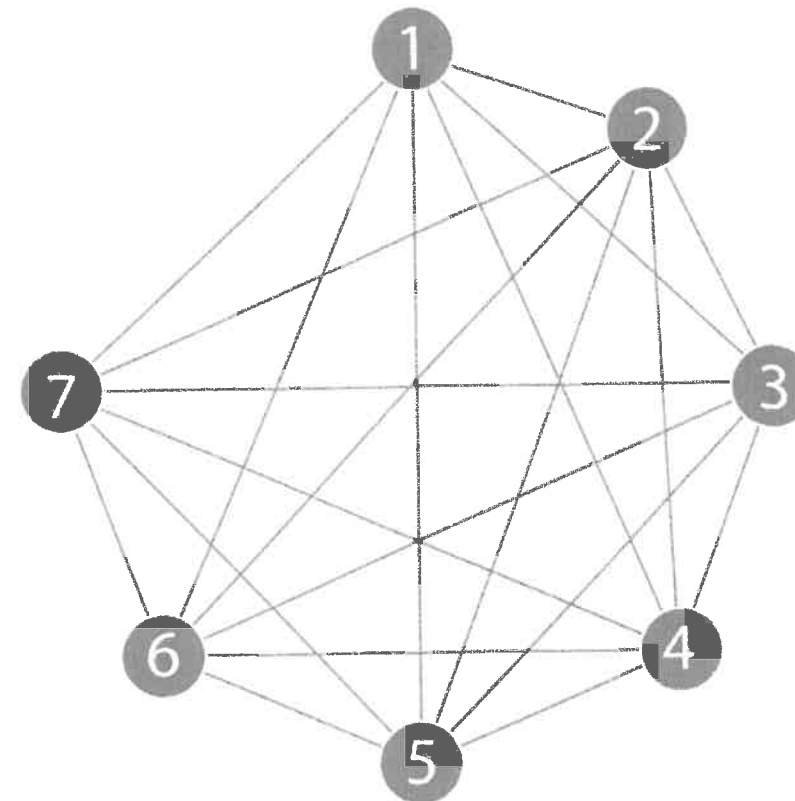
UNIT 8 MANAGING TEAMS AND PROJECT COMMUNICATION

EXERCISE 8A

- (i) There are seven questions that help to identify the most important aspects of a project team:
1. What technical skills are required, and are there people who already possess these skills?
 2. What non-technical skills are required, and are there people who already possess these skills? Do they offer unique benefits to the project team?
 3. Do any political or social factors need to be considered when forming the team?
 4. If certain people are made part of the team, would they benefit the project (such as by providing increased credibility or visibility)?
 5. Who could be made responsible for providing access to information and other resources?
 6. Do potential candidates have a track record as team players? Team members must be assessed regarding whether they will cooperate and work in synergy with their colleagues.
 7. What is the ideal size for the project team?
- (ii) Some people enjoy solving problems or applying their technical expertise, while others enjoy receiving recognition for their contributions or talents, growing as employees and gaining new skills, performing refreshing tasks that are not part of their normal daily duties, accomplishing something of importance, attaining rewards, or working with people from different specialisations or departments. Offering team members certain responsibilities can lead to a happier and more motivated project team.
- (iii) Onboarding ensures that team members understand the culture of the project environment, and that they are equipped with all the tools and information required for them to become productive members of the team.

EXERCISE 8B

- (i) a. Note: An eighth channel is included in light grey to illustrate how the model would look with a complete team.



(Source: EDGE Learning Media (Pty) Ltd, 2020)

Figure 8.1: Communication model

- b. $C = (N \times [N - 1]) \div 2$
 $C = (7 \times [7 - 1]) \div 2$
 $C = (7 \times 6) \div 2$
 $C = (42) \div 2$
 $C = 21 \text{ channels}$
- c. Six people will be affected.

(ii) Answers may vary. The following serves as a guide.

- Physical barriers include environmental factors, such as noise; for example, 'Construction taking place at my office made it difficult for me to hear the person on the other end of the phone.'
- Psychological barriers include factors such as personality; for example, 'I struggled to get along with a very perfectionistic co-worker.'
- Semantic barriers are barriers that hamper the comprehension of the message; for example, 'English was my colleague's third language.'

(iii)

	Kick-off	Status
When	Before the project begins	At regular intervals
Information	Factual information and documentation	Project assessment updates
Sharing	The vision of the project	New information

EXERCISE 8C

(i) Answers may vary. The following serves as a guide.

South Africa		
Dimension	Score	Interpretation
Power distance	49	To a large extent, people accept the power structure in South Africa.
Individualism	65	South Africa is a predominantly individualistic society.
Masculinity	63	South Africans prefer masculine traits in their workers. The 'live-to-work' mentality is strongly represented in South Africa.
Uncertainty avoidance	49	South Africans are adept at dealing with uncertainty and a lack of structure, policy and laws.
Long-term orientation	34	South Africans prefer tradition and cultural norms over pragmatic and modern ways of doing things.
Indulgence	63	South Africans are an impulsive and indulgent society that trend toward optimism.

(Source: EDGE Learning Media (Pty) Ltd, 2020; adapted from Hofstede Insights, n.d.)

Table 8.1: Example of Hofstede's dimensions of culture

(ii) Answers may vary. The following serves as a guide.

Elon Musk:

- He called a rescue worker a paedophile on an international, public forum.
- At first, Musk tried to use his wealth and considerable social media influence to get public opinion on his side. He also attempted to pay a reporter to write a negative story about the rescue worker. Lastly, he tried to claim that it was a popular insult from when he was at school. When these attempts failed, he met the rescue worker in open court and settled the matter.
- Musk used a mix of three strategies at different times in the conflict: avoidance, smoothing, and forcing, with mixed success.

(iii) Answers may vary. The following serves as a guide.

- Eskom hiring and providing contracts to friends and families; Donald Trump hiring his family as White House staff; Patricia de Lille handing city contracts to friends and family.
- With Eskom relying on nepotism and cronyism, there is consensus among the public that the company has failed. Many projects are overbudget and behind schedule. Public and internal opinion of the organisation are at historic lows.

PROJECT MANAGEMENT IN PRACTICE

(i) Answers may vary. The following serves as a guide.

There was a clear lack of induction and orientation for team members during the forming stage of development. Team members do not seem to have had the opportunity to get to know their co-workers and learn the skills and expertise each member could provide to the project. It is also important that the project manager assigns roles and responsibilities to the team and provides a clear structure on who does what. Together, these two principles create the framework for a team to operate effectively within their roles, while still working together with the rest of their team to solve issues. Owing to a poor forming stage of development, when the team reached the storming stage of development, there were a host of issues that needed to be addressed if this project team was to progress out of this stage of development. It is a good time for Sandy to identify the members of the team who need to be coached to be more assertive in team discussions, and those who need to learn to be more effective listeners. If this stage of development is to be overcome, team members will need to work together to resolve conflicts and accept that individual differences will occur. As the project manager, Sandy needs to lead by example and implement effective conflict-resolution strategies.

- (ii) Answers may vary. The following serves as a guide.

Sandy could break up the team into organised sub-teams, and have team leaders or representatives act as neutral external facilitators for each of the core aspects of the project. Regular meetings should be conducted for each of the sub-teams, and then the representatives of each team can attend a main meeting with Sandy to provide feedback on project progress and operations. Sandy will then have a clearer picture of project progress and direction.

- (iii) Cultural differences; a lack of a shared or common goals; and personality differences.

- (iv) Answers may vary. The following serves as a guide.

- a. If the conflict is allowed to continue for too long, team cohesion and morale will suffer. If team members are no longer unified in their efforts, their output will deteriorate. Deadlines will not be met, resources and knowledge will not be shared, and communication regarding critical matters will fail. Similarly, if the team is suffering from low morale, they will not be motivated to work or collaborate. The project will suffer as a result.
- b. Confrontation or forcing

UNIT 9 MANAGING RISKS, STAKEHOLDERS AND PROCUREMENT

EXERCISE 9A

- (i) The corporate image of the company **could** be at risk, which would impact the continuation of business after the completion of the project. This could result in the company not being able to secure future business with customers, or having a tarnished reputation with existing customers. The relationship that the company has with its third-party stakeholders may also be affected. This could result in poor relations with authorities, communities, and other parties, which could reduce their cooperation on future projects. The company's stakeholder positioning may change from supportive to neutral, or they may distance themselves to a resistant position.
- (ii) Qualitative risk analysis is performed when the risk is not immediately measurable with a numerical value (number). It describes the qualities that risks have, and explains what sort of impact they would have on the project. One key method in qualitative analysis would be interview sessions, where questions are asked to the customer, project team, or other relevant party. This analysis is performed before any numerical values are assigned, and before performing interviews, it is necessary to understand the nature of the risks. Quantitative analysis, on the other hand, is when numerical values are assigned to the risks. We may use the impact and probability model, in which case we would assign a number to the impact and a number to the probability of a risk (nought to ten, for example). These numbers would be assigned according to the descriptions that have been provided in the existing qualitative analysis. The numbers we have assigned to the risks can then be used to rank risks according to their importance, which can help us to decide the management strategy required to handle each risk.
- (iii) Expert judgement can be useful in both qualitative and quantitative risk analysis. In qualitative analysis, an expert would be able to help you ask the right questions during the interview process, or to use appropriate descriptions in order to define the impact that a risk would have on the project. In quantitative analysis, an expert would be able to advise you about how to use a methodology of scoring, and help you to analyse the data that you have produced. In this way, their technical skills can come in handy to interpret any graphs, tables, scores or categories that your data may include.

EXERCISE 9B

- (i) **Constructing** a dam wall is a difficult and potentially dangerous task. Accidents are a real risk, especially since the construction makes use of various pieces of heavy machinery. As the team will be working on top of the dam wall, any miscalculation or mistakes could be fatal to the workers. The dam is at 70 per cent capacity, and this means that during the course of the project, there is a risk of flooding before the construction ends, so the construction of the dam wall should be completed before the rainy season. If it happens that rainfall does cause flooding, the entire project may be compromised. The construction of the dam wall requires raw materials (inputs) such as concrete, cement, steel and human labour. If one or more of the suppliers fail to deliver the required raw materials in time, it is a risk that would delay the completion of the entire project. A final risk is that the farmers are unhappy with work that has been done on the dam in the past, and they may not be supportive of the project. This could result in protests or opposition to the project, which could increase the likelihood of an accident, or conflict between project workers and protestors taking place.

- (ii) Answers may vary. The following serves as a guide.

Expert judgement: This is one of the qualitative techniques used to describe the impact of risks on projects. For example, an expert in dam construction will have vast experience, as well as the skills required to construct a dam wall. This level of experience enables them to ascertain potential project risks, as well as to recommend various useful tools or help the team to interpret data from various source documents.

Probability distributions: This is one of the quantitative techniques that can be used to determine the impact of risks, by showing the costs associated with each potential risk. A decision tree can be used to show each risk and the costs associated with different risks.

- (iii) Answers may vary. The following serves as a guide.

Transfer: Risk transfer is when the project manager transfers the risk associated with the construction project to a third-party company. The project manager can arrange insurance for the project, and in case of a natural disaster, such as heavy rains, the insurance would cover the costs.

Mitigate: Mitigating risk is another risk avoidance strategy that can be used by the project manager. For risks such as running short of raw materials, the project manager can make use of project planning, writing strict contract agreements with various suppliers in advance to ensure the project receives its required inputs. The project manager can also ensure that these are supplied well in advance.

EXERCISE 9C

- (i) **Change** is inevitable; however, it is important to ensure that the necessary project changes are implemented correctly. The project team should draft a change management plan that details the change needs, records how the project will be impacted by the change and explains how the change will be implemented. A well-detailed change management plan will help to minimise the negative impact of any change to a project. Any positive changes also need to be managed properly to ensure that opportunities are fully maximised.

- (ii) A project manager should encourage their project team to give feedback for the assigned projects, or when any communication is sent to them via email or other forms of communication. This will ensure that the receiver has fully understood what was communicated. They should also encourage the project team to avoid using jargon, or at least use jargon that all team members understand. This is because use of unfamiliar jargon can distort a clear understanding of what is being communicated, and can lead to ineffective communication. Lastly, they should encourage their project team to communicate precisely and avoid sharing too much unnecessary information, which may hinder the objective of the communication.

- (iii) Answers may vary. The following serves as a guide.

Building bridges: Building bridges is a proactive approach that anticipates a potential source of conflict, and seeks to create an alternative path that would suit both parties. A dispute that might arise from contract terms may be handled with the use of experts in contract writing. This will eliminate any conflict among the internal stakeholders, before or after they have signed the contract.

Negotiation: This is a common approach to conflict resolution, in which both parties work together to find a settlement that is favourable to each side. Negotiation can also include a third party to help them reach an amicable resolution. Overall, the aim of negotiation is to achieve a win-win outcome.

UNIT 10 PROJECT MONITORING AND CONTROL

EXERCISE 10A

(i)

- a. 3.
- b. 4.
- c. 2.
- d. 5.
- e. 1.

(ii) False. Zion National Park would not have been able to address the problem by bringing new butterflies into the park. There would still be no wildflowers for the butterflies to feed on, and they would soon die off. To find a long-term solution, Zion National Park would have to deal with the root cause of the issue: allowing too many people into the park. The influx of tourists scared away the mountain lions, which led to an increase in the deer population, overgrazing and destruction of cottonwood saplings, erosion of riverbanks, washing away of topsoil, the destruction of wildflowers and the disappearance of butterflies. Similarly, if you change one component of a project (such as scope), it will have an impact on other elements (such as time, cost, quality and human resources).

(iii) Answers may vary. The following serves as a guide.

Yes. Scope creep could affect the achievement of a project. If change requests are not subjected to a formal change-control process, many small changes can be added to a project. This may result in the project taking on a different scope to what was initially agreed. The team may lose focus regarding the core outputs and outcomes, as they will be distracted by a series of 'nice-to-have' features, which are not necessary and will not generate more value. Scope creep makes it difficult to finish projects on schedule and meet budget constraints. With the increased workload and consequent pressure, quality may also suffer; for example, project team members may rush their work and cut corners. Ultimately, this will result in a dissatisfied customer.

Or

No. If scope creep is taken to simply mean changes in scope that occur during the process of project execution, then it is not necessarily a problem. Some project sponsors and clients, through no fault of their own, do not have a clear idea at the outset of the exact nature of the product or service that the project must produce. Instead, they may have a fairly vague idea of what needs to be done. However, as the project progresses and things become clearer in their minds, they may develop new ideas. The development of prototypes can also give them a better sense of what they need. In this way, the scope develops through a process of trial and error. These changes to the scope can be accommodated in an agile project management methodology, whereby the scope is fixed for a one-month period (a sprint) and change requests are incorporated into the next or future sprints.

EXERCISE 10B

(i) An imbalance between the demand and supply of labour means that the two are not equal. Either demand exceeds supply or supply exceeds demand. When demand exceeds supply, it means that there are not enough workers to cope with the workload. When supply exceeds demand, it means that there is insufficient work for labourers.

(ii) Answers may vary. The following serves as a guide.

If a project team member was due to put in 40 hours of work this week, but has been hospitalised and will only return to work next week, the project manager may have to ask a functional manager for a suitably qualified and experienced person to be assigned to the project in the person's absence. Alternatively, the project manager could delay the work until next week, provided it does not have a negative impact on the project deadline date.

(iii) The project manager needs to confront team members who do not arrive at meetings on time. Simply keeping quiet about the matter and hoping things will automatically rectify themselves will not solve the problem. Instead, culprits are likely to presume that they can continue arriving late.

The whole project team is typically pressed for time throughout the day. Consequently, project managers often have to limit the length of project meetings, and therefore need to discuss a number of important agenda items in a restricted time frame. If somebody arrives late, it can lead to the meeting starting late. Alternatively, if the project manager decides to start promptly, the missing team member may miss out on important information. It is also possible that the person's input would be required early in the meeting. Besides all these points, being persistently late, without a legitimate reason, is a sign of disrespect, poor organisation and points to a lack of professionalism.

EXERCISE 10C

- (i) If it is pouring with rain and you see a person vigorously mopping a tennis court to attempt to dry it, you may say the person is very efficient. They seem to work in a systematic fashion, covering the entire court in a short amount of time and pushing loads of water to the sides of the court and into the gutters. However, you would hardly consider the person to be effective. There seems to be no point in trying to dry a tennis court while it is raining. A more effective thing would have been to cover the court with a tarpaulin as soon as it started to rain. So, effectiveness addresses the question of whether you are doing the right thing. Efficiency merely looks at your method of work and whether you are working productively (irrespective of whether or not you are doing the right, most sensible thing).
- (ii) Quality assurance helps to ensure that the customer does not receive substandard products. If you build quality mechanisms into a process, you are more likely to produce outputs that are fit for purpose. In this way, you do things right the first time, every time – there is no need for rework. Rework wastes time and resources. By monitoring and controlling the quality of work and work products, you greatly reduce the need for rework. There is an inverse (opposite) relationship between quality assurance and rework; as you perform more quality assurance, you will benefit from not needing to do as much rework.
- (iii) Yes and no. In the workplace, *both* productivity and quality need to be monitored and controlled. If you only measure people on their productivity, they will focus on their rate of output – to the detriment of quality. Many quality issues will likely arise, leading to dissatisfied clients, rework, damaged reputation and, ultimately, declining business fortunes. However, this does not mean that people's productivity should not be monitored. If a company incentivises their employees on the basis of their quality scores and does not take productivity into consideration, most people will end up working too slowly and producing too few outputs. The business will not be able to remain competitive. Both productivity and quality therefore need to be monitored and controlled.

EXERCISE 10D

- (i) A fixed-price contract with a supplier indirectly helps a company to manage its procurement costs by incentivising the supplier to *closely* monitor costs and stop them from becoming overinflated. The supplier knows that it will not be able to charge the project company more than what was agreed in the contract. It will therefore have to work productively and effectively to ensure that it can meet its own target profit margins. With a fixed-price contract, the project manager (and sponsor) is in a better position to control their purchase costs, which often constitute a *high* proportion of overall project costs.

- (ii) If you assessed a *risk* as being highly improbable (e.g. less than one per cent chance), beyond your ability to control (e.g. a tornado), or otherwise having a minimal impact on the project, you would accept the risk and only put measures in place to deal with the risk once it materialises. You would not go to all the effort and expense of putting measures in place to try to avoid the risk or lessen its impact beforehand. Instead, you would say to yourself: 'I accept the fact that it could happen and, if it does, I will take action to reduce the impact on the project'.
- (iii) A trigger point establishes a threshold for the activation of contingency measures to reduce the adverse impact of an issue. If there was no threshold, then you would feel obliged to try to control things whenever they slip beyond your target. For instance, if your budgeted expenditure for the week was R 50 000 and your actual expenditure was R 50 100, you might think you need to take immediate, corrective action to get your budget back on track. However, such a trivial deviation would hardly justify such drastic actions. By putting a trigger point in place that only calls for action when the budget is exceeded by five per cent, you will only need to respond when the actual expenditure for the week is R 52 500. It is only natural that there will be slight deviations from plans throughout the course of the project. However, when the deviations are large enough to cause concern, they should be dealt with immediately. Trigger points help you to discern and respond to such occurrences.

PROJECT MANAGEMENT IN PRACTICE

- (i) The project manager assumed that staff would contribute to the project without needing motivation to do so. The project manager should have realised that their engagement would require taking active measures to win them over. The following active measures could have been initiated:
 - Indicating how the project was aligned with the organisational strategy and would assist in helping it reach its goals
 - Obtaining their input as to where their knowledge was lacking and what articles would help them perform their work better
 - Providing training on how to access knowledge articles and how to post new articles
 - Pointing out the personal benefits of contributing to and using the knowledge base
 - Pointing out how the knowledge base would help provide clients with improved service
 - Applying change management principles to overcome resistance to change
 - Appointing knowledge champions to foster positive word-of-mouth advertising about the project and its benefits
 - Putting quality procedures in place to facilitate the creation of concise, well-written knowledge articles that would be user-friendly

These measures would have helped to obtain user buy-in and to garner enthusiastic support and full commitment toward project success. Users would have felt empowered to use the system and motivated by the perceived benefits. Well-written articles would lend credibility to the knowledge base and would encourage regular use of the system.

(ii) Some suggested performance indicators include:

- budgets, broken down into labour, materials and equipment categories;
- a Gantt chart, indicating planned activity start dates, end dates and durations;
- quality standards for deliverables;
- risk assessment scores; and
- milestone dates for the completion of deliverables.

(iii) It appears that the project manager failed to obtain the active engagement and buy-in of senior management. 'Inadequate resource provision' could refer to human resources, information resources, physical resources or financial resources. The project manager ought to have realised that – with their limited organisational power – they would not be in a position to secure organisation-wide commitment to ensure project success. An essential ingredient of success would be to have strong allies in the form of a project sponsor, the client, the chief executive officer (CEO) and senior management. The project manager failed to win over senior management by discussing the project benefits and did not succeed in getting them to vocally advocate for these benefits to users and other stakeholders. When problems arose during project execution, the project manager failed to engage with senior management and obtain their assistance in overcoming these problems. Without senior management backing, there was little motivation on the part of project team members, users and stakeholders, who could influence project outcomes, to lend their much-needed support. The project manager underestimated the need to regularly communicate with senior management, inform them about issues, ask for their input, and influence them to take a stand as powerful project advocates. This reduced the credibility of the project in the eyes of users, who did not implement the end product, and had a negative effect on the project outcome (due to their limited use of the system).

UNIT 11 PROJECT CLOSURE

EXERCISE 11A

- (i) If you do not inspect the vendor's work as the project progresses, the vendor is likely to assume that you are satisfied with the quality of the work. Likewise, if you say nothing when they submit a deliverable late, they may assume that everything is okay. Saying nothing does not help the problem go away. Instead, it typically leads to things getting worse and more out of control. By raising an objection about the supplier's outputs and expressing your dissatisfaction, you make it clear to them that the work needs to be fixed. You also need to make the supplier aware of the impact of quality shortcomings and missed deadlines on the overall project schedule and cost. When the supplier has a better understanding of why they need to change their approach, they will be more inclined to make the necessary changes. When you constantly monitor and provide feedback on the supplier's performance, you give them a chance to fix problems as they occur, rather than allowing issues to spiral out of control. The supplier will also prefer to know about any issues immediately, rather than facing a big surprise at the end of the project when they discover, for the first time, that you have not been happy with their work all along, and that you are only prepared to make the final payment once they have completed and rectified a long list of outstanding items.
- (ii) A relatively high final payment can be tremendously effective in motivating a supplier to wrap up all outstanding tasks. Many customers know from previous project experience that there are typically various small, frustrating problems that the supplier has failed to fully resolve by the end of the project. By stipulating that the final payment (a relatively large proportion of the overall payment) will only be paid once all loose ends are tied up, the customer sends a strong signal to the supplier that they will not accept the non-completion of items that have proven to be challenging.

Money is a powerful incentive for people. Suppliers cannot remain financially viable if they cannot cover their costs and achieve their targeted profit margins. Therefore, by making the final payment disproportionately large compared to other payments, the customer provides the supplier with a strong motivation to fully resolve all outstanding issues with the product. Of course, some suppliers are motivated mainly by producing a good end product, regardless of financial incentive.

- (iii) Hard factors, such as the quality of deliverables produced, adherence to schedule and budget, and delivery in line with scope requirements, are key factors in evaluating a supplier's performance. However, the evaluation should not be restricted to hard factors alone, as soft factors are equally critical. Imagine you went to eat out at a restaurant, and your meal was outstanding (and delivered quickly) and the cost was very reasonable. However, there was no hostess to welcome you at the door and, moreover, the waitress was extremely curt and rude. You would not think the whole experience was particularly good, would you? Relationships are crucial in business. Customer service comprises a wide range of soft factors that impact an individual's or institution's willingness to do business with another entity. Humans are not robotic creatures; we have feelings and wish to be treated with respect and honesty. Therefore, it is important that the project organisation evaluate its suppliers not only in terms of technical proficiency (and other hard factors), but also in terms of soft factors.

EXERCISE 11B

- (i) Business customers invest in projects in order to reap positive financial benefits. These could come in the form of savings, increased revenues or improved profitability. Usually, it is not the project's product that is of ultimate interest to the customer per se, but rather, the value that will accrue to the customer as a result of utilising (or selling) that product/service. The product or service itself is simply a means to an end (e.g. improved profitability, increased competitiveness or business survival). Often, these benefits can only be established some time after the project deliverables have been handed over. Therefore, if you were to ask a customer how satisfied they are with the project outcomes immediately after delivering the final product, they may not be in a position to tell you. If you developed a software application for the customer aimed at improving employee productivity (and thereby generating cost savings), it may take time for these productivity improvements to accrue. This may be due to a learning curve or time needed for coaching or change management, or for incentive systems to take root. The customer can only really tell you they are happy with the project if the expected productivity improvements materialise, and this may take a while to happen. Consequently, it is often worth postponing the customer satisfaction survey until an appropriate later date.
- (ii) Executives are busy people with an immense number of responsibilities on their shoulders. They have a lot to do, but only limited time in which to do it. When you present them with a project review report that looks like a book or lengthy thesis, they will be reluctant to look at it, as they simply do not have the time. Therefore, it is always wise to begin your report with a fairly high-level executive summary that gives these important stakeholders an overview of project achievements, outcomes, successes, challenges and recommendations. Executives mostly want to get to the heart of the matter as quickly as possible and do not want to get bogged down in all the nitty-gritty details.

Traditionally, project review reports began with an extensive background context, followed by discussions of project methodologies adopted, risks encountered, detailed breakdowns on product features and various other intricate details, before finally arriving at the overall results and recommendations. In other words, the reader had to wade through page after page of information before they finally got to, arguably, the most important section: the overall results and recommendations. Usually, they would give up the arduous reading task after just a few pages. An executive summary provides a concise, immediate outline of all the most critical information needed by senior stakeholders. This is often all the executive needs to know to be adequately informed and to be in a position to make any relevant decisions. If the executive wishes to read further, they can always examine further details in the rest of the report and/or appendices.

- (iii) Yes, because it is not enough to review performance exclusively at the individual or team level, since both levels of performance need to be evaluated. In most modern project environments, project performers depend on the assistance of others in order to do their work. They may need to obtain information from others, or they may only be able to begin a task once a fellow team member has produced a certain output. It is, consequently, vital that people work together as a team, cooperating with each other and coordinating their actions closely. No matter how capable and willing an individual may be, if they do not have the required support from others, they will not be able to fulfil their responsibilities. Therefore, it is important to assess team effectiveness when performing a project review. By the same token, one cannot ignore individual performance. Each person needs to fulfil their individual responsibilities. They cannot ride the coat-tails of their fellow team members. Each team member must be held accountable for their own performance, which explains the importance of assessment at an individual level. If team performance is measured to the exclusion of individual performance, many individuals will not apply adequate effort to fulfilling their individual responsibilities. On the other hand, if individual performance is measured without taking team performance into account, then organisations will end up with a situation where individuals compete against each other and there is minimal cooperation or collaboration. People are motivated to act in line with how they are measured and evaluated, as demonstrated by the saying 'what you measure is what you get'.

EXERCISE 11C

- (i)
- a. 2.
 - b. 3.
 - c. 4.
 - d. 1.
- (ii) People can potentially learn a lot from their mistakes. However, this is not automatic and it depends upon a number of things, including the following:

- The person must be prepared to acknowledge that they made a mistake.
- The person must be willing to learn from their mistakes.
- The person must make the effort to change the way they do things.

In an organisation where it is unacceptable to make mistakes, people are too fearful of owning up to the fact that they made an error, because they expect to be punished or rebuked. Consequently, they hide the mistake, hoping that no one will find out. In contrast, in an organisation that sees mistakes as opportunities to learn and avoid making those same mistakes in future, individuals feel comfortable about acknowledging their errors. In these organisations, individuals are often requested to capture these lessons so that they can be added to a central repository where other organisational members can learn from these lessons. In this way, a learning organisation is closely correlated with a culture that accepts the fact that people make mistakes. By contrast, in an organisational culture where people are sharply criticised for making mistakes, the organisation fails to reap the benefits of sharing (and utilising) lessons learned from making mistakes.

- (iii) Even if Thomas Edison failed in almost 10 000 attempts to create a working bulb, he did succeed on his final attempt. In this respect alone, one could argue that he never failed, because Edison, himself, did not see these attempts as failures. On the contrary, he viewed each 'failure' as a valuable lesson in learning what *not* to do to create a working light bulb. Each failure only brought him one step closer to perfecting his invention. Additionally, most people would probably have given up the attempt to make the world's first light bulb after a few failures. One could argue that the light bulb was never going to be invented by anyone on their first attempt. Edison recognised that his many 'failures' provided him with a wealth of invaluable information, without which he would never have been in a position to make a working light bulb. In his eyes, 'failure' was critical to his ultimate success.

PROJECT MANAGEMENT IN PRACTICE

(i)

- *Lesson one:* The project management organisation assumed that all railway-building projects are alike, whether high-speed or traditional. The significant project challenges they faced taught them that a high-speed railway project is much more complex in terms of the technicalities involved. Assuming that it would be similar to building a traditional railway resulted in incorrect time and cost estimates, as well as scoping errors and the resultant need to make a lot of changes during the construction process.
- *Lesson two:* Project delays highlighted the importance of having a comprehensive risk management plan in place, accompanied by a risk management system that could detect events precipitating the need to implement contingency plans. Project managers need to be adept in planning for and managing risk. They also need strong coping skills in the wake of crisis situations that emerge when large risk events materialise.

- *Lesson three:* Project managers need to realise that project success depends on more than the technicalities of schedule management, cost management and project management methodologies. They also need to account for the competing political interests of different stakeholders, and realise the importance of creating social harmony in the midst of potentially explosive stakeholder relationships. Project managers need to be able to influence stakeholders with divergent interests to work toward a common goal, emphasising the benefits that all parties will receive in the end.

- (ii) Answers may vary. The following serves as a guide.

- The project was a failure (perhaps not a total failure, but certainly a failure). It failed in achieving its schedule and cost goals. Moreover, there appeared to be a significant lack of project management skills, which are needed to create a sense of coordination among the thousands of activities that comprise such a project. Contractors also did not seem to have a broad overview of the project and how their own work fit into the overall project scheme. There was a lack of communication, which was exacerbated by the fact that there was no integrated project management system providing an up-to-date and overall view of project progress. Lastly, risks, particularly those impacting the schedule, do not appear to have been properly identified and planned for.
- It was both a success and a failure. It was a success to the extent that it ultimately achieved its objective of completing what it set out to do – i.e. to finish a highly advanced engineering project that now operates successfully, bringing significant benefits to South Korea's citizens and the economy at large. However, it was a failure to the extent that it fell short of being finished on time and within budget. It was also not successful in terms of the haphazard project management and risk management processes carried out.
- The project was a success (perhaps not an unqualified success, but still a success). It ultimately achieved its objective of completing what it set out to do – i.e. to finish a highly advanced engineering project that now operates successfully, bringing significant benefits to South Korea's citizens and the economy at large. The project was not terminated early, despite delays, cost overruns and competing political interests. Parties persevered, in spite of all the obstacles they faced, to develop a world-class, high-speed railway network that is actively used by millions of people today.

- (iii) Inadequate risk management processes played a significant part in the project failing to meet its scheduled deadline and budget. For one thing, the fact that there was no integrated project management system meant that project management was not able to monitor activities on all the different sections of the project at once. They could not monitor the risks faced by each of the thousands of contractors, with the result that they were not in a position to put adequate response plans in place to minimise their

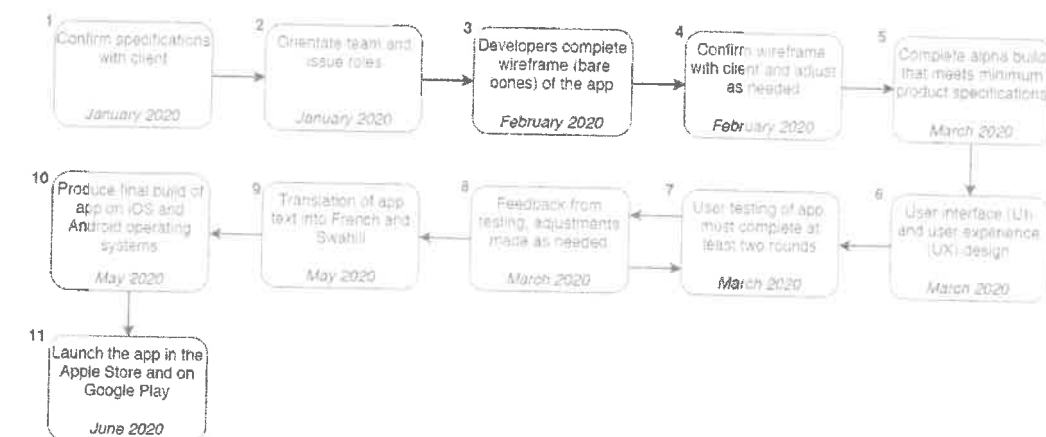
probability or reduce their impact once the risk materialised. Numerous unforeseen events unfolded, throwing the whole project plan off target and culminating in the product being finished five years behind schedule. In the face of risk events that did materialise, project management appeared to be overwhelmed, not knowing what to do. Had a systematic risk management plan been in place, it is likely that fewer risk events would have been encountered and sound contingency plans would have been employed to try get the project back on schedule.

UNIT 12 PROJECT MANAGEMENT IN PRACTICE

EXERCISE 12A

Your road map should resemble the following diagram.

Music app roadmap



(Source: EDGE Learning Media (Pty) Ltd, 2020)

Figure 12.1: Road map for Deborah's music app created using Draw.io

The app specifications you should have listed alongside this map include the following:

- User, musician and administrative accounts can be created
- Musician music management functions, including free and royalty releases
- 'Upload music' and 'music player' functions
- Advertising can be served to users based on their language and demographics
- Search function, including categories such as style, location, and similarity
- App language selection, including English, French and Swahili
- Administrative functions to block, ban, or suspend user accounts

EXERCISE 12B

Your WBS table should resemble the following example.

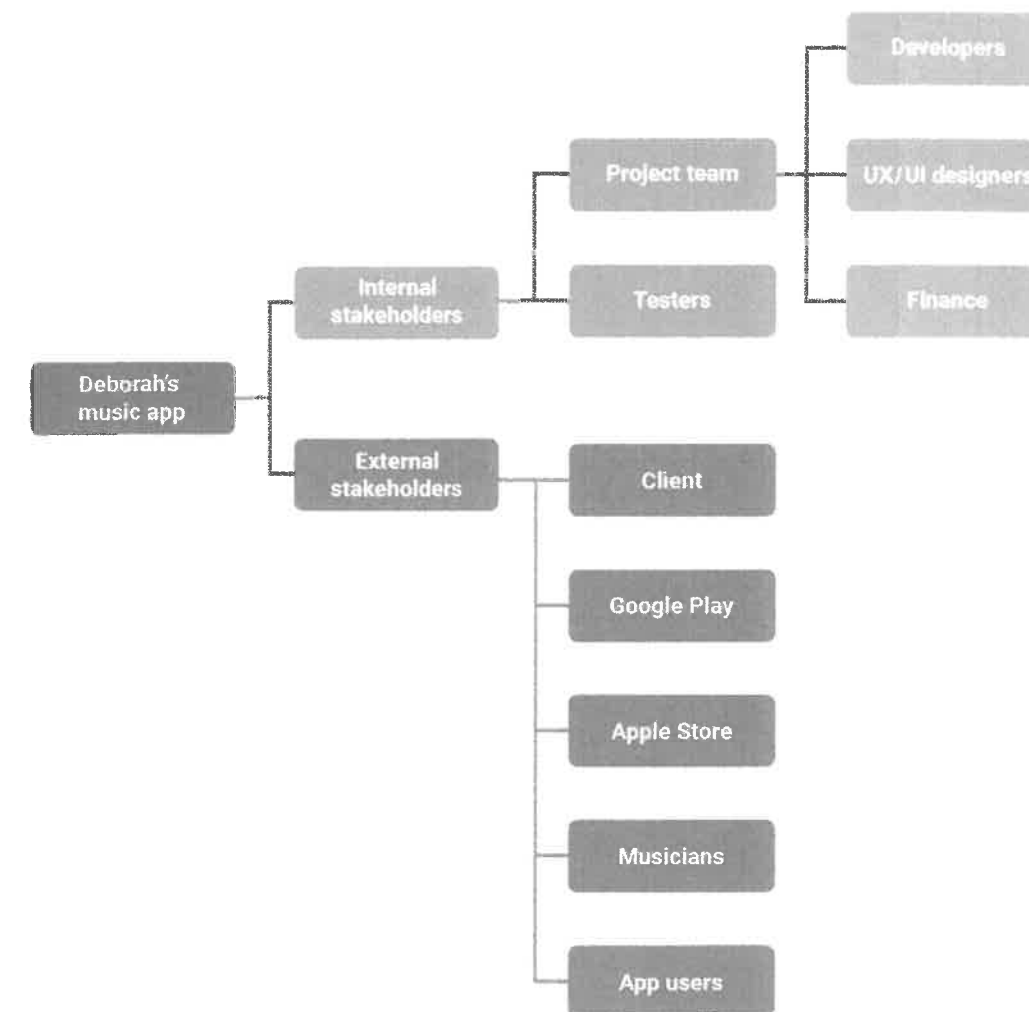
Music app WBS		
Level 1	Level 2	Level 3
1. Alpha build	1.1 Confirm app specifications with client	1.1.1 Develop specifications with client
		1.1.2 Sign off specifications with client
	1.2 Secure team	1.2.1 Identify project team members
		1.2.2 Secure project team members
		1.2.3 Kick-off meeting with team
		1.2.4 Develop WBS
		1.2.5 Develop Gantt chart
	1.3 Develop wireframes	1.3.1 Develop iOS wireframe
		1.3.2 Develop Android wireframe
	1.4 Sign off wireframes with client	1.4.1 Present both wireframes to client
		1.4.2 Implement any necessary changes
		1.4.3 Sign off both wireframes with client
2. Beta build	2.1 Build minimum viable product	2.1.1 Develop iOS app
		2.1.2 Develop Android app
	2.2 User interface (UI) and user experience (UX) design	2.2.1 Develop iOS UI and UX
		2.2.2 Develop Android UI and UX
		2.2.3 Finalise iOS designs
		2.2.4 Finalise Android designs
		2.2.5 Submit iOS and Android designs
	2.3 User testing	2.3.1 Secure user testing group
		2.3.2 Implement round one of user testing
		2.3.3 Implement round two of user testing
	2.4 Feedback and adjustment from user testing	2.3.4 Extra rounds implemented as required
		2.4.1 Adjust for round one of user testing
		2.4.2 Adjust for round two of user testing
		2.4.3 Adjustment for any additional rounds
3. Release build	3.1 Translate app text	3.1.1 Secure translators
		3.1.2 Translate text into French
		3.1.3 Translate text into Swahili
		3.1.4 Submit translated text
		3.1.5 Amend errors for iOS and Android
	3.2 Push iOS and Android apps to production	3.2.1 Push iOS app to production
		3.2.2 Sign off on completed iOS app
		3.2.3 Push Android app to production
	3.3 Launch in Apple and Android stores	3.2.4 Sign off on completed Android app
		3.3.1 Launch iOS app in Apple Store
		3.3.2 Launch Android app on Google Play

(Source: EDGE Learning Media (Pty) Ltd, 2020)

Table 12.1: WBS table for Deborah's music app

EXERCISE 12C

Your stakeholder map should resemble the following diagram. Your map may have different colours or lines depending on the program you used to create it.



(Source: EDGE Learning Media (Pty) Ltd, 2020)

Figure 12.2: Stakeholder map for Deborah's music app

EXERCISE 12D

Your risk management plan should resemble the following table.

Possible risk	Likelihood	Impact	Proactive	Reactive
Budget shortfall	Medium	High	Monitor expenses weekly. Identify causes of over-/under-expenditure and address, with possible solutions. Review the following week to see if solutions were effective	Communicate with client, if required, and ask permission to reallocate funds between budget lines
Schedule delays	Medium	High	Set weekly deadlines. Monitor progress weekly. Weekly check-ins with full team. Identify issues causing delays and address with possible solutions. Review the following week to see if solutions were effective	Communicate with client, if required, and request extension, if possible
No endorsement from the Department of Basic Education (DBE)	Low	High	Contact the DBE at project start date to allow for the maximum amount of time for securing DBE endorsement	Leverage client's contacts to open doors at DBE, if necessary
Not enough tutors hired	Low	Medium	Contact local tertiary institutions and advertise tutoring to earn a part-time income. Produce marketing material such as posters and place these at tertiary institutions. Use social media such as Facebook to promote the opportunity to earn income part-time	Advertise in local papers for part-time online tutors
Not enough learners enrolled	Medium	High	Contact high schools and promote the platform as a valuable learning resource. Produce marketing material such as posters and place these at schools. Use social media such as Facebook to promote the platform	Increase scale and scope of school and learning outreach to multiple channels

Learners are not active in their subject groups	Medium	Medium	Send out weekly reminders of the resources available on the platform. Source possible rewards for learner platform activity, such as data vouchers	Contact a selection of inactive learners to find out why they are not active
The quality of the online tutoring is not adequate	Low	Medium	Screen tutors prior to selection. Provide tutor support and guidance. Request ongoing learner feedback on the quality of tutoring through quick surveys	Remove poorly rated tutors from the platform. Continue to advertise for new tutors on an ongoing basis

(Source: EDGE Learning Media (Pty) Ltd, 2020)

Table 12.2: Risk register for Deborah's matric tutoring platform

EXERCISE 12E

Your quality management plan should resemble the following table.

Production steps	Quality standards	Quality assurance	Quality control
Apples are delivered from farms	Apples are sourced from high-quality suppliers	Fruit supplier contractor vetting process	All new fruit suppliers must be signed off by the director before approval and drafting of a contract
Apples go to storage	Apples to be stored in temperature-controlled containers upon arrival	- Arrival of fruit truck and loading fruit into storage containers are timestamped actions - There should be no more than a 30-minute gap between fruit truck arrival and apples being loaded into storage containers - Software produces timestamped reports daily	Timestamp reports to be reviewed daily by director

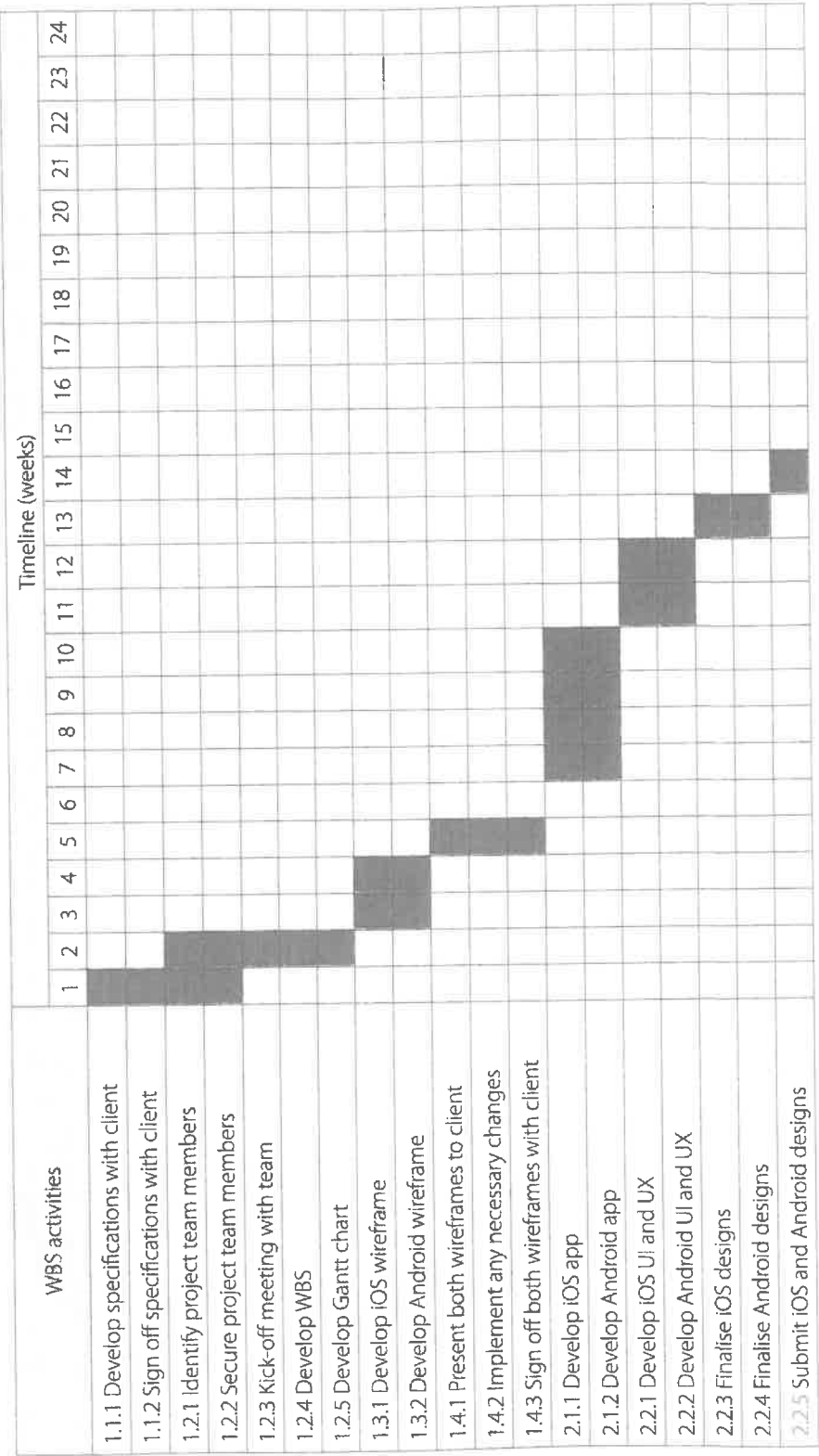
Fruit selection	No rotten or damaged fruit to be sent to juicing	Software using visual recognition to automate identification of damaged or rotten fruit. Machines respond to alert from software to remove identified rotten or damaged fruit from the conveyor belt. Software produces hourly reports on fruit removal	Fruit removal reports checked against the fruit arriving at the juice section, in order to assess the quality of damaged fruit identification and removal
Approved fruit is sent to juicing station	Fruit is received, and both the weight and quantity are measured	Software records fruit weights and counts the number of apples in each batch	Periodic review of weight and quantity reports, corresponding to physical checks
Fruit is crushed and juice is extracted	Juicing equipment is cleaned and disinfected daily	Software monitors automated machine cleaning and disinfection, and produces daily reports	Daily juicing equipment cleaning and disinfection reports are checked against the actual state of machines.
Extracted juice is sent to the bottling section	Storage and transportation between juicing and bottling must not exceed 15 minutes. Temperature is set at 18 degrees Celsius	- Software timestamps juice extraction and bottling - Software monitors temperatures	Timestamp reports are viewed hourly
Bottled juice is packed in the packaging section	- Juice storage and transportation between bottling and packaging must not exceed 15 minutes - Temperature of 18 degrees Celsius must be maintained	Software timestamps juice bottling and packaging, while monitoring temperature	Timestamp and temperature reports are viewed hourly. Automatic alerts are sent
Packaged juice stored in warehouse	Temperature of 18 degrees Celsius must be maintained	Software monitors temperature and adjusts air conditioning in the warehouse	Temperature reports are viewed hourly. Automatic alerts are sent
Packed juice is distributed to retailers	Temperature of 18 degrees Celsius must be maintained	Software monitors temperature and adjusts refrigeration during transportation	Temperature reports are viewed hourly. Automatic alerts are sent

(Source: EDGE Learning Media (Pty) Ltd, 2020)

Table 12.3: Quality management plan for an apple juice factory

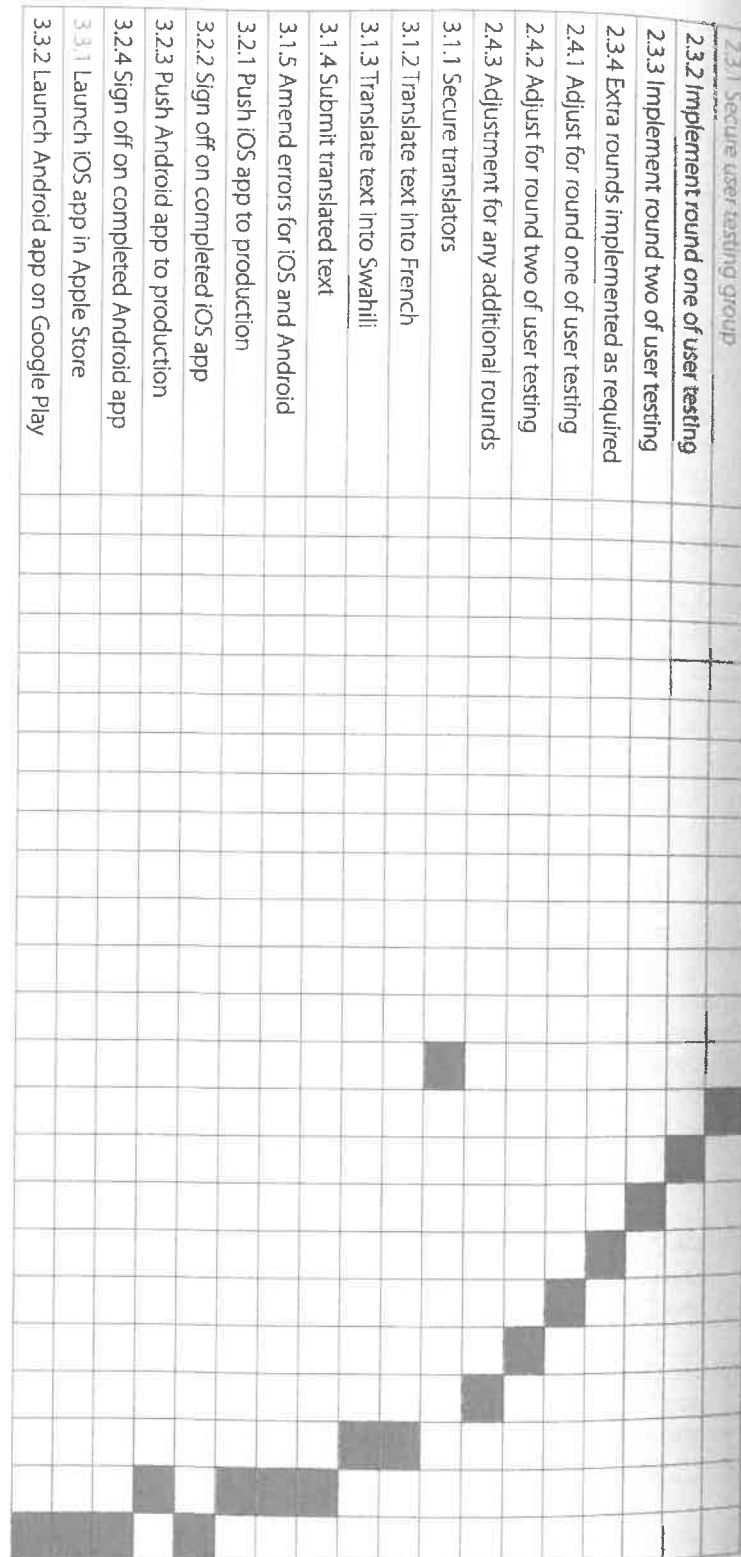
EXERCISE 12F

- (i) The following Gantt chart is an example of how the tasks in the WBS for Deborah's music project can be scheduled along a timeline. Your Gantt chart should look similar to this example.



(Source: EDGE Learning Media (Pty) Ltd, 2020)

Table 12.4: Gantt chart for Deborah's music app



EXERCISE 12G

Your kick-off meeting agenda should resemble the following example.

8 January 2020
10h00–12h00

1. Attendees:
 - Project manager
 - Finance
 - Software developers
 - Designer
2. Agenda:
 - Welcome
 - Review of the kick-off meeting agenda
 - Music app project:
 - Deliverables:
 - Purpose of app
 - App users
 - App functionality
 - App platforms: iOS and Android
 - Time frame
 - The project team:
 - Management
 - Development
 - Design
 - Roles and responsibilities
 - Project schedule – detailed review
 - Project risks:
 - Time management
 - Budget management
 - Other
 - Project management:
 - Project document folder on internal server

- Daily check-in schedule
- Weekly check-in schedule
- Communication about urgent problems
- Schedule progress meetings
- Questions
- Close meeting

EXERCISE 12H

Your team charter should resemble the following document.

1. Team members:

- Project manager
- Finance
- Software developers
- Designer

2. Team communication:

- All team communication will take place on the project WhatsApp group and via email.
- All team members to be online at all times during working hours, except when on leave or when on sick leave.
- All team members are to keep up to date on a daily basis with all communication sent via these channels.

3. Team challenges and concerns:

- Team members must raise any concerns or challenges they are facing immediately with the project manager, so that a solution can be found without undue delays or impacts on the project.

4. Team conflict management:

- Team members must raise any conflict issues they are facing immediately with the project manager, so that a solution can be found without undue delays or impacts on the project.
- All team members are to focus on resolving any conflict as amicably and professionally as possible, with the least amount of possible negative impact on the project.

5. Team meetings and check-ins:

- All team members are to attend all meetings and check-ins they are invited to.

- Any team member unable to attend a meeting or check-in must inform the meeting check-in leader beforehand.
- It is each team member's responsibility to retrieve information from any missed meetings.

6. Team standards:

- All team members will fulfil their duties and responsibilities to the best of their abilities at all times.
- All team members must respond to and meet any deadlines for feedback and input, as required.
- All team members must support the attainment of the project objective at all times.

7. Assessing team performance:

- The team will meet every Friday for 30 minutes to review performance, address any issues, agree upon any remedial or corrective actions, and adjust the team charter, as required.

EXERCISE 12I

Your scope management table should resemble the following document.

Process to be followed	Detailed steps	Documentation required
Identifying a potential issue that affects the project scope	1. Team member identifies potential scope issue 2. Team member discusses issue with project manager 3. Issue log is created	Entry in issue log
Analysing the potential issue	1. Scope issue analysed for: • improvement of overall project outcomes; • cost implication for budget; • implication of project time frame and deadlines; and • implications for project team capacity	Scope adjustment request form
Identifying possible alternatives	1. Project manager designates specific team members to source at least three alternatives and analyse each in terms of: • cost implication for budget; • implication of project time frames and deadlines; and • implications for project team capacity	Scope adjustment request form

Formal approval/ rejection process	1. Project manager presents issue log with the necessary details to senior manager and client for review.	Scope adjustment request form
Decision documentation requirements	1. Decisions taken by senior manager and client recorded in issue log. 2. Both client and senior manager must provide digital signatures.	Scope adjustment request form
Communicating the decision to the project team and client/funder	1. Decisions taken are communicated to project team and client by email, attaching the signed-off scope adjustment request form.	Scope adjustment request form

(Source: EDGE Learning Media (Pty) Ltd, 2020)

Table 12.5: Scope management table

EXERCISE 12J

Procurement management	Procurement standard	Monitoring	Control
Rental of land	Suitable land to be identified	GPS coordinates of potential land submitted to project manager	None
	Costs of suitable land obtained	None	None
	Comparative analysis of land rental options	Rental costs and details submitted to project manager for each suitable site	No rental agreement may be entered into without at least four comparative alternatives being reviewed
	Site visit to all potential lands	Site visit inspection to take place for all shortlisted lands	No rental agreement may be entered into without a site visit by the project manager to the lands in question
	Decision made	Project manager and finance manager to make decision	Decision is communicated in writing to site manager
	Rental agreement received and reviewed	Rental agreement submitted to project manager and finance manager	All rental agreements are to be reviewed by project and finance managers
	Rental agreement signed	Finance manager signs the rental agreement	No rental agreements may be undertaken without the finance manager's signature

Purchasing of equipment, services and fixed assets	Source potential suppliers	At least three potential suppliers should be identified	- Any potential suppliers that have familial connection with any members of the organisation are excluded from the procurement process - All products, goods and services must meet required industry standards and must have SABS approval
	Quotations received from suppliers	- At least three comparable quotes must be received - All potential suppliers need to be vetted for business and tax registration status	- The finance and project managers must vet at least three potential suppliers for business and tax registration statuses - Vetted supplier quotes must be digitally signed as 'vetted' by either the project manager or the finance manager
	Quotations approved	Quotation is approved by finance or project managers	- The approved quote must be digitally signed as 'approved' by the finance manager or the project manager - No quotation may be approved from a supplier that has not been vetted by the project or finance managers - The approved supplier must complete a supplier form and be entered onto the payment system - No company that has not been vetted by the finance or project managers may be entered onto the payment system

Supplier contract	All suppliers of approved quotations must complete a supplier contract, which is submitted and signed off by the finance manager	- All products, goods and services must meet required industry standards and have SABS approval - All supplier contracts must clearly specify delivery dates, the expected quality of goods and services, as well as warranty, service and refund details - All supplier contracts must be signed off by the finance manager
Order submitted	None	No payment may be made to any supplier who has not completed a supplier form and who has not been vetted by the finance manager
Invoice received	All procurement invoices must be forwarded to the project manager	The project manager must sign off on all invoices before payment can be made
Payment made	Finance officer must send proof of payment to site manager and suppliers	- No payment may be made on any invoice that does not have the project manager's signature - No payment may be made to any supplier who is not entered on the payment system
Goods received	- The delivery or shipping invoice for all procured goods must be signed by the site manager and submitted to the finance manager - All products, goods and services must be delivered on time, as per the supplier contract	- Finance must have a shipping/delivery invoice with the site manager's signature for every invoice requiring payment - Breaches of supplier contract must be reported to the finance manager within 24 hours

(Source: EDGE Learning Media (Pty) Ltd, 2020)

Table 12.6: Procurement management table for the food garden project

EXERCISE 12K

Process to be followed	Detailed steps	Documentation required
Identifying a potential issue that affects project quality in terms of the following: - Quality standards - Quality assurance - Quality control	- Team member identifies a potential quality issue - Team member discusses the issue with the project manager - An issue log is created	Entry in quality issue log
Analysing the potential issue	Suggested changes to the project quality management plan are analysed for: - improvement of overall project outcomes; - cost implications for the budget; - implications of project time frames and deadlines; - implications for project team capacity; and - any additional equipment and resources required	Project quality management adjustment request form
Identifying possible alternatives	Project manager designates specific team members to source at least three alternatives that could address the quality issue and analyse each in terms of: - cost implication for the budget; - implications of project time frames and deadlines; - implications for project team capacity; and - any additional equipment and resources required	Project quality management adjustment request form
Formal approval/rejection process	Project manager presents proposed quality management change with necessary details to senior manager and client for review	Project quality management adjustment request form

Decision documentation requirements	- Decisions taken by senior manager and client are recorded in project quality management adjustment request form - Both client and senior manager must provide digital signatures on the project quality management adjustment request form	Project quality management adjustment request form
Communicating the decision to the project team and client/funder	The decision made is communicated to project team and client by email, attaching the signed-off project quality management adjustment request form	Project quality management adjustment request form

(Source: EDGE Learning Media (Pty) Ltd, 2020)

Table 12.7: Quality process control table

EXERCISE 12L

The following acceptance agreement is an example. Yours should look similar, but may be worded differently. Check that you have each necessary element in your own acceptance agreement.

Project name: Sunshine Juice Factory

Project start date: 01/05/2019

Project manager: C. Henderson

Project end date: 01/10/2019

Client: Andrew Waites

This document indicates the formal acceptance of all deliverables for the Sunshine Juice Factory software development project. This project has met all the required deliverables set out in the scope statement. A project audit and product evaluation were conducted to verify that all project deliverables met the required quality, performance, function and product standards.

The live software platform has been handed over to the client's operations manager. Training of the Sunshine Juice Factory IT support and operations teams has been completed. The software documentation and codes have been handed over to the Sunshine Juice Factory operations manager.

After project acceptance, the project manager will conduct a post-project review, document the lessons learned, close all project processes and release the project team. Once this final phase has been completed, the client will be informed, and the project manager will be released from this project.

Client project acceptance

Approved by the client

Signature	Full name	Designation	Date
_____	_____	_____	_____

EXERCISE 12M

Project component	Project subcomponent	Action to be taken	✓
Project product	Project deliverables	Hand over to client	
Intellectual property	Copies of all developed content Software codes	Hand over to client	
Access	Passwords Account details Web links	Hand over to client	
Project knowledge	Learning	Conduct learning review with project team	
		Document learning for future use	
Project documentation	Scope statement	Update and archive	
	Risk management plan	Update and archive	
	Risk incident register	Update and archive	
	Quality management plan	Update and archive	
	Scope management plan	Update and archive	
	Quality assurance reports	Update and archive	
	Quality control reports	Update and archive	
	Quality change reports	Update and archive	
	Scope change reports	Update and archive	
	Procurement management plan	Update and archive	
	Project schedule	Update and archive	
	Project schedule change reports	Update and archive	
	Stakeholder management plan	Update and archive	
	Financial management plan	Update and archive	

EXERCISE SOLUTIONS

	Project budget change reports	Update and archive	
	Project financial reports	Update and archive	
	Communication management plan	Update and archive	
	Final project report	Submit the final project report to the client	
Project team	Project release	Release internal staff members to other projects	
		End contracts of staff hired for the project duration	
External contracts	Contracts with external service providers	Confirm that there are no outstanding invoices or payments	
		End contracts of external service providers hired for the duration of the project	
Project finances	Finalise project expenses	Ensure that all expenses are allocated to the project budget accurately	
		Ensure that there are no outstanding invoices or payments	
		Check the final project expense report against the budget	
		Analyse the final report for variance against the original budget	
	Bank accounts	Close any external bank accounts created during project execution	
Project resources	Project resources	Close any internal project accounts with the internal finance department	
		Release and reallocate to other projects	
		Dispose of project resources	

(Source: EDGE Learning Media (Pty) Ltd, 2020)

Table 12.8: Project closure checklist